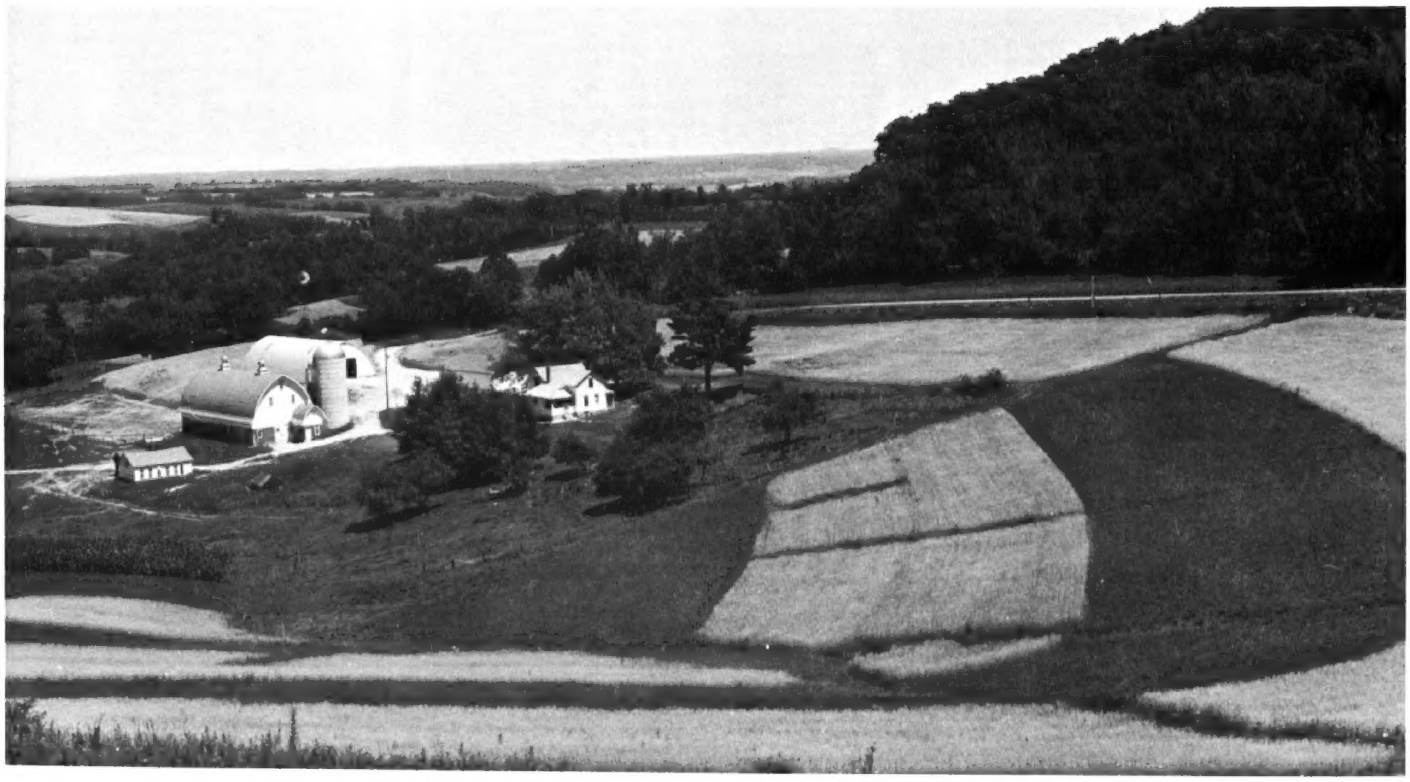
SOIL SURVEY OF

Trempealeau County, Wisconsin



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Wisconsin Research Division of the
College of Agriculture and Life Sciences
University of Wisconsin

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in the period 1958–1967. Soil names and descriptions were approved in 1968. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1968. This survey was made cooperatively by the Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin. It is part of the technical assistance furnished to the Trempealeau County Soil and Water Conservation District.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All of the soils of Trempealeau County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the woodland group and wildlife group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and woodland groups.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife."

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and recreation areas in the section "Engineering Uses of the Soils."

Engineers and builders can find, also under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Trempealeau County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the county given in the section "General Nature of the County."

Cover: **Contour strips and wooded uplands on a farm in Trempealeau County.**

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SOIL SURVEY OF TREMPEALEAU COUNTY, WISCONSIN

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH THE WISCONSIN RESEARCH DIVISION OF THE COLLEGE OF AGRICULTURE AND LIFE SCIENCES, UNIVERSITY OF WISCONSIN

TREMPEALEAU COUNTY is in the west-central part of Wisconsin (fig. 1). Its boundaries are partly formed by three rivers—the Mississippi River on the south, the Trempealeau River on the west, and the Black River on the southeast. The county is about 42 miles long and 18 to 23 miles wide. It has a land area of about 470,340 acres.

Trempealeau County is in the scenic driftless, or coulee, region of Wisconsin. The land area is a highly dissected plateau that is characterized by narrow ridges and fairly broad valleys. Most of the soils formed in eolian or alluvial silt, sandstone or limestone residuum, and water-laid sandy material. About 55 percent of the county consists of moderately steep and steep soils on uplands. The elevation ranges from about 1,200 feet above sea level on the high limestone ridgetops to about 800 feet on the adjacent valley bottoms.

Farming is the leading enterprise in the county. About 45 percent of the land area is in crops. Hay, oats, and corn are the major crops. These are used mainly for feeding dairy herds and other livestock. About a fourth of the county is woodland that consists mostly of black, red, and white oak on steep topography. These trees are harvested mainly for oak veneer, logs, sawlogs, and railroad ties.

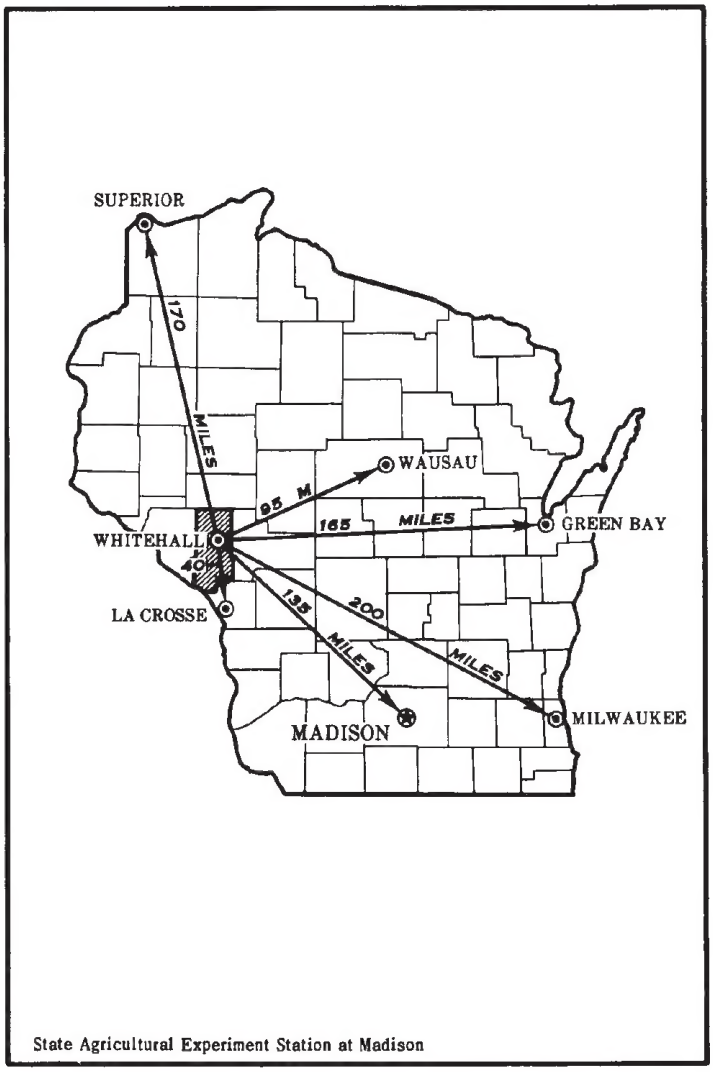

Figure 1.—Location of Trempealeau County in Wisconsin.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Trempealeau County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface

layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Hixton and Ettrick, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Urne silt loam, 6 to 12 percent slopes, eroded, is one of several phases within the Urne series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. One such kind of mapping unit is shown on the soil map of Trempealeau County: the soil complex.

A soil complex consists of areas of two or more soils, so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Eleva-Gale complex is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Stony and rocky land is a land type in Trempealeau County.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

Soil scientists observe how soils behave when used as a growing place for native and cultivated plants and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or a high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil, and they relate this failure to the high shrink-swell potential of the soil material. Thus, they use observation and knowledge of soil properties, together with available research data, to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Trempealeau County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, drainage, or other characteristics that affect management.

The names, descriptions, and delineations of soils in this survey do not always agree or join fully with those of surveys of adjoining counties published at an earlier date. Differences are brought about by modifications and refinement in soil series concepts. Also, it is more feasible to include soils, small in extent, with similar, more extensive soils if use and management are much the same. For example, the Dubuque-Fayette-Stony and rocky land association, along the eastern edge of the Buffalo County survey area, does not agree with the Fayette-La Farge-Eleva association along the western edge of the Trempealeau County survey area. In this part of Trempealeau County, the limestone that characteristically underlays the Dubuque soils and Stony and rocky land is thin or completely eroded away, and sandstone predominates. For this reason, small extensions and outliers of the Dubuque-Fayette-Stony and rocky land association of Buffalo County are included with the Fayette-La Farge-Eleva association of Trempealeau County.

The eight soil associations in Trempealeau County are described in the following paragraphs.

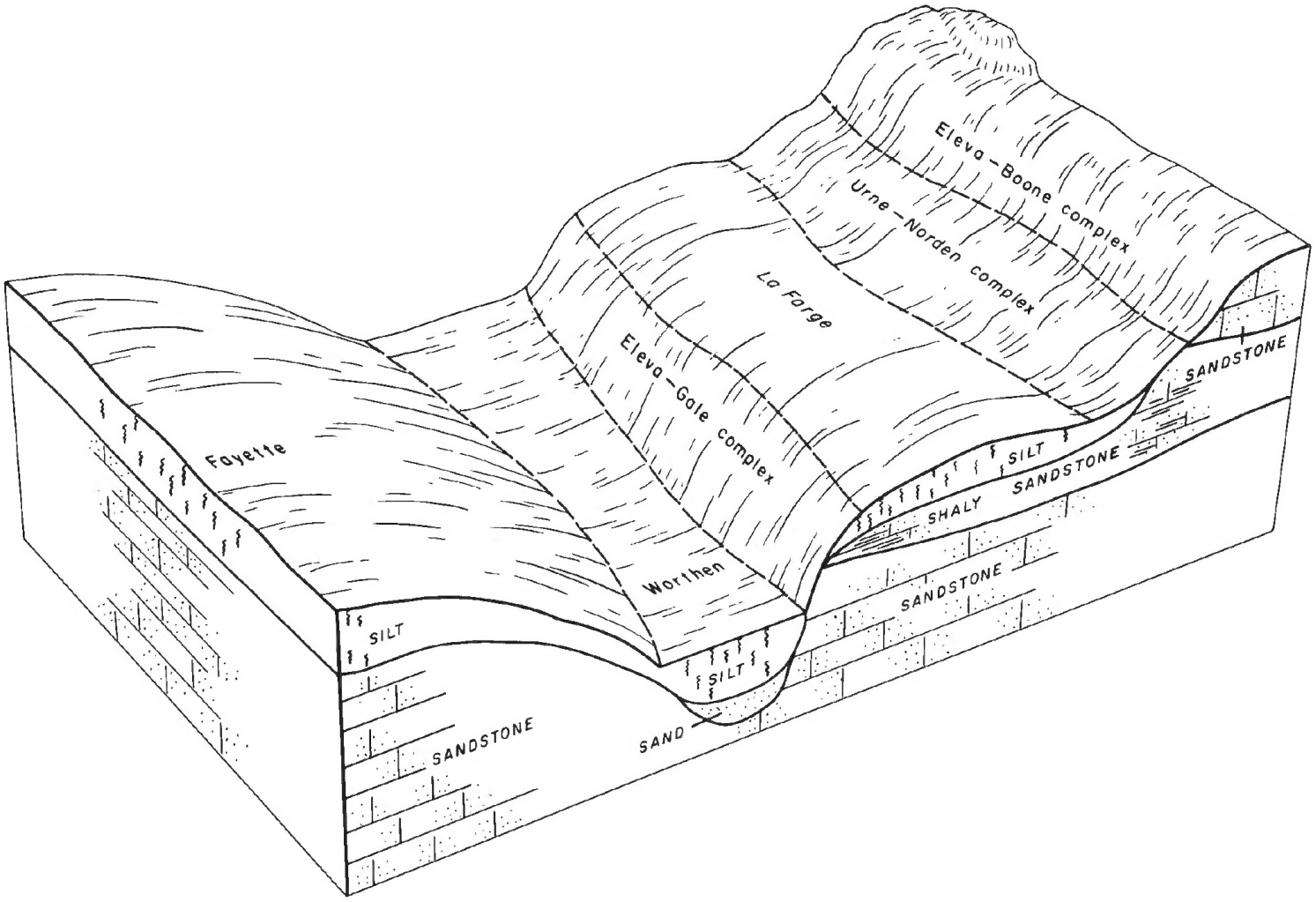

Figure 2.—**Topography, major soils, and underlying material in association 1.**

1. Fayette-La Farge-Eleva association

Well-drained soils that have a subsoil of sandy loam to silty clay loam; moderately deep to deep over sandstone; on uplands

This association consists of gently sloping to very steep, highly dissected sandstone uplands that are characterized by relatively narrow ridgetops and narrow valley bottoms. About 60 percent of this association is moderately steep or steeper (fig. 2).

This association occupies about 40 percent of the county. Fayette soils make up about 20 percent of the association, La Farge soils 16 percent, Eleva soils 16 percent, and minor soils the remaining 48 percent. Areas of this association nearest to Elk Creek and Buffalo River in the northern part of Trempealeau County, near the boundary with Buffalo County, have a smaller percentage of Fayette and La Farge soils and a larger percentage of Eleva soils and the minor Hixton and Boone soils. Areas of this association in the southern part of the county, along the boundary between Trempealeau and Buffalo Counties, have a lower percentage of La Farge and Eleva soils and a higher percentage of the minor Palsgrove soils, clayey subsoil variant, and Stony and rocky land. The delineations of this association in Trempealeau County agree with those on the general soil map for Buffalo County.

Fayette soils are on the top and sides of ridges on uplands. These soils are well drained and are mainly gently sloping to moderately steep. In cultivated areas the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil is dark yellowish-brown to brown heavy silt loam to silty clay loam that is strongly acid. It is underlain by dark yellowish-brown silt loam at a depth of about 43 inches.

La Farge soils are on the top and sides of ridges on uplands. These soils are well drained and are mainly sloping to moderately steep. In undisturbed areas the surface layer is very dark grayish-brown silt loam about 2 inches thick. The subsoil is strongly acid, dark-brown to yellowish-brown silt loam and silty clay loam that grades to loam with depth. It is underlain by olive-brown, shaly sandstone at a depth of about 36 inches.

Eleva soils are on the sides of valleys and ridges. These soils are well drained and are mainly sloping to

moderately steep. In most areas they are closely intermingled with Gale and Boone soils and are mapped in complexes with these soils. The surface layer is dark grayish-brown sandy loam about 5 inches thick. The subsoil is dark yellowish-brown to brown sandy loam that is strongly acid. It is underlain by cemented, brownish-yellow sandstone bedrock at a depth of about 46 inches.

The minor soils in this association are Palsgrove soils, clayey subsoil variant; Boone, Gale, Hixton, Urne, Norden, Seaton, Worthen, Huntsville, Lawson, and Ettrick soils; and Stony and rocky land. Well-drained Palsgrove soils, clayey subsoil variant, are on ridgetops and are underlain by limestone bedrock. Excessively drained and well-drained Boone, Gale, Hixton, Urne, and Norden soils are generally in moderately steep to very steep, convex areas on uplands. Well drained and moderately well drained Seaton and Worthen soils are in nearly level to steep, concave areas of valleys and upland drainageways. Well-drained to poorly drained Lawson, Huntsville, and Ettrick soils are in drainageways along narrow valley bottoms and in upland draws.

Natural fertility is low in the Boone and Eleva soils and medium to high in the other soils of this association. Most of the soils in this association are moderately steep or steeper and are subject to a severe hazard of water erosion. Gully erosion is common on Seaton, Huntsville, and Worthen soils. The available water capacity is low or very low in Stony and rocky land and in Boone, Eleva, and Urne soils. It is moderate to high in other soils in this association.

The gently sloping to moderately steep soils in this association are used for crops or pasture. Corn, oats, and hay are the main crops. These crops are used to feed dairy herds and other livestock. Use of the soils as grassland is emphasized, and many of the moderately steep areas are in pasture and hay. Most of the steep and very steep areas are suited to wildlife habitat and to hardwoods such as red and white oak.

2. *Billett-Sparta-Gotham association*

Well drained to excessively drained soils that have a subsoil of sandy loam to loamy sand over sand; on stream and river terraces

This association consists of nearly level to moderately steep stream and river terraces. Most of this association is gently sloping. It is steeper, however,

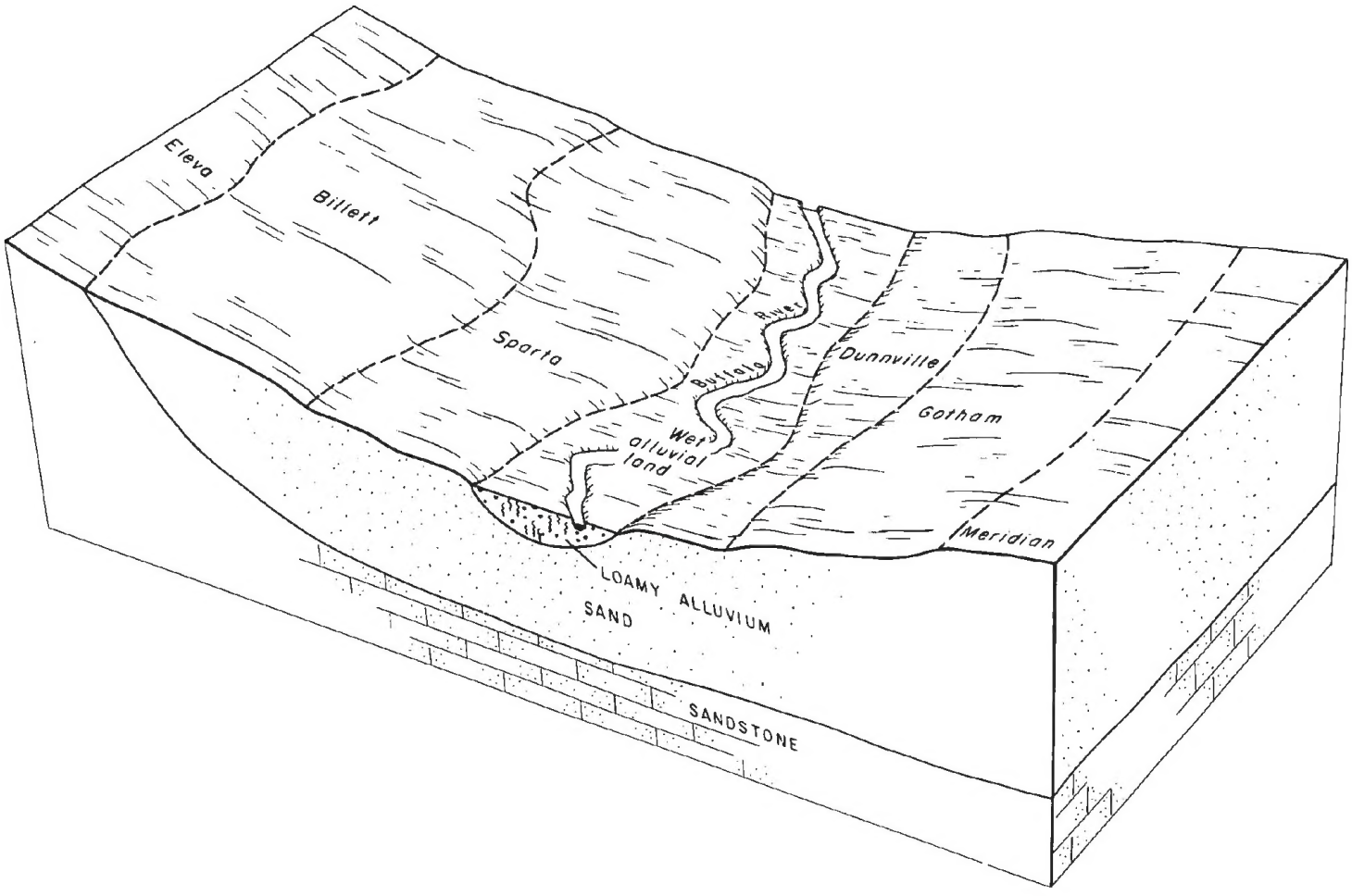

Figure 3.—**Topography, major soils, and underlying material in association 2.**

where the terraces are adjacent to the sandstone uplands (fig. 3).

This association occupies about 14 percent of the county. Billett soils make up about 25 percent of the association, Sparta soils 15 percent, Gotham soils 15 percent, and minor soils the remaining 45 percent.

Billett soils are on high terraces. Some areas on terraces adjacent to sandstone uplands are underlain at a depth of slightly more than 60 inches by sandstone bedrock. These soils are well drained and are mainly gently sloping to sloping. In cultivated areas the surface layer is very dark grayish-brown fine sandy loam about 9 inches thick. The subsoil is brown heavy sandy loam that ranges from slightly acid to strongly acid. It is underlain at a depth of about 30 inches by brownish-yellow medium sand.

Sparta soils are mainly on terraces adjacent to streams and rivers. These soils are excessively drained and are mainly nearly level to gently sloping. The surface layer is very dark grayish-brown loamy fine sand about 16 inches thick. The subsoil is brown loamy sand that is strongly acid. It is underlain at a depth of about 30 inches by brownish-yellow coarse and medium sand.

Gotham soils are on stream and river terraces. These soils are somewhat excessively drained and are mainly gently sloping to moderately steep. In cultivated areas the surface layer is very dark grayish-brown loamy fine sand about 9 inches thick. The subsoil is brown to dark-brown loamy sand and heavy loamy sand that is strongly acid. It is underlain at a depth of about 36 inches by light yellowish-brown medium sand that has bands of dark-brown loamy sand and sandy loam.

The minor soils in this association are Kato soils, sandy loam variant; Meridian, Dunnville, Trempealeau, Whitehall, Shiffer, Eleva, and Hixton soils; and Wet alluvial land. Well-drained Meridian soils are generally on high river terraces adjacent to the sandstone uplands. Well drained and moderately well drained Dunnville, Trempealeau, and Whitehall soils are generally on low terraces adjacent to the rivers. Somewhat poorly drained and poorly drained Shiffer soils and Kato soils, sandy loam variant, are generally in drainageways and depressions on river terraces.

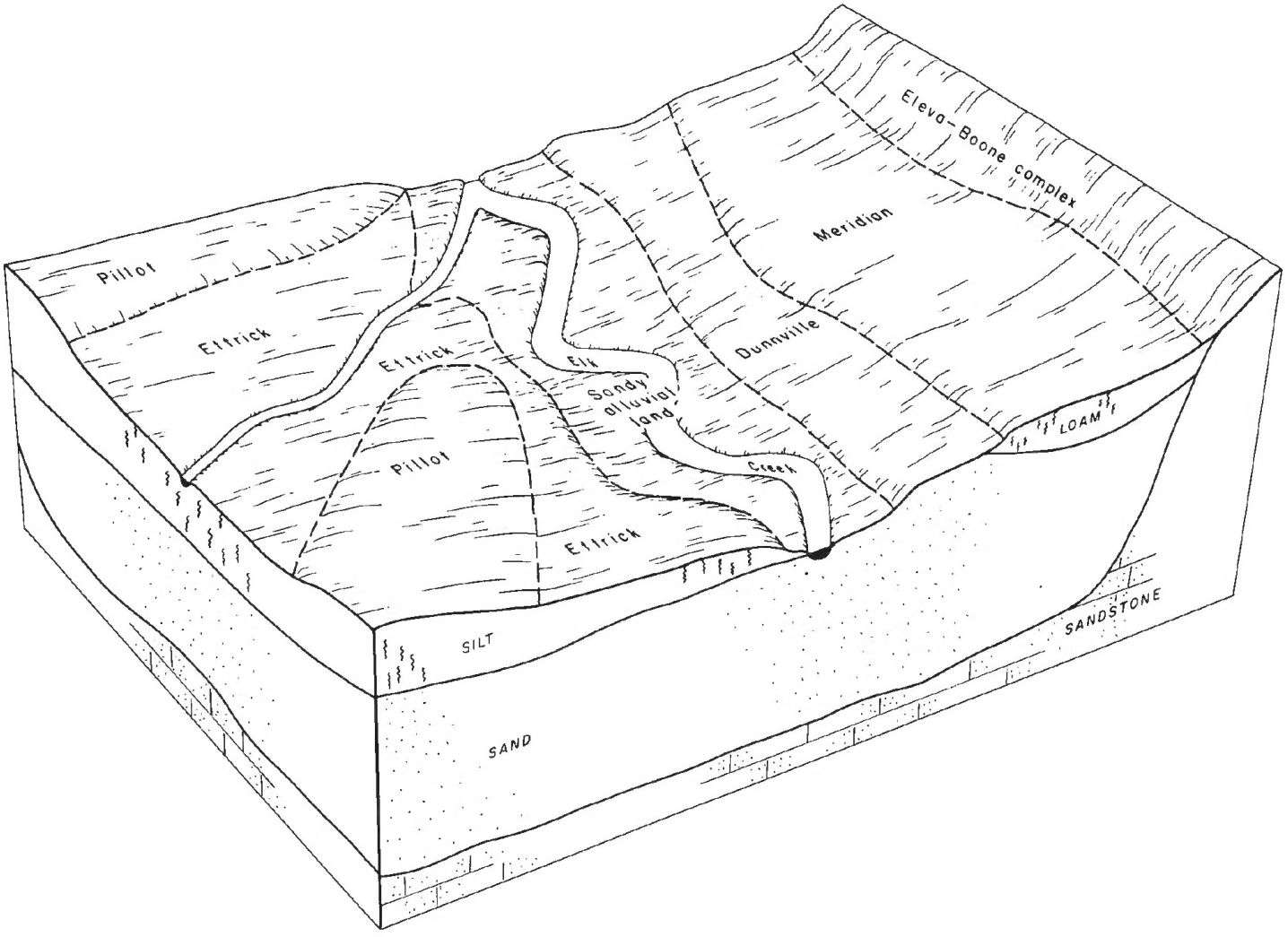

Figure 4.—**Topography, major soils, and underlying material in association 3.**

Well-drained Eleva and Hixton soils are in sloping to steep valley areas. Wet alluvial land is on bottom lands and flood plains along streams and rivers.

Natural fertility is low in the Sparta, Gotham, Dunnville, and Billett soils and medium in the other soils of this association. The available water capacity is low in the Gotham, Sparta, Billett, and Dunnville soils and moderate in the other soils of this association. The hazard of soil blowing is severe in large cultivated areas of Gotham, Sparta, Billett, and Dunnville soils. Shiffer soils and Kato soils, sandy loam variant, have a seasonally high water table. Kato soils, sandy loam variant, are wet in some areas, and Wet alluvial land is wet most of the time.

Most areas of these soils are used for crops or pasture, but some large areas, mainly of Sparta soils, are planted to pine trees. Corn, oats, and hay are the main crops. These crops are used to feed dairy herds and other livestock.

3. *Ettrick-Pillot-Meridian association*

Poorly drained and well drained soils that have a subsoil of loam to silty clay loam over silt loam and sand; on valley bottoms or stream and river terraces

This association consists of nearly level to sloping stream and river terraces. Most of this association is nearly level to gently sloping. It is steeper, however, where terraces are adjacent to the uplands (fig. 4).

This association occupies about 12 percent of the county. Ettrick soils make up about 20 percent of the association, Pillot soils 10 percent, Meridian soils 10 percent, and minor soils the remaining 60 percent.

Ettrick soils are on valley bottoms. These soils are poorly drained and are nearly level. In cultivated areas the surface layer is very dark gray silt loam about 12 inches thick. The subsoil is grayish-brown and light grayish-brown, neutral silt loam and silty clay loam that has many brownish-gray and brown mottles. It is underlain at a depth of about 38 inches by grayish-brown silt loam.

Pillot soils are on high stream and river terraces. These soils are well drained and are nearly level to sloping. In cultivated areas the surface layer is very dark gray silt loam about 11 inches thick. The subsoil is brown to dark yellowish-brown silt loam and silty clay loam that grades with depth to loam and is very strongly acid. It is underlain at a depth of about 34 inches by light-gray medium sand.

Meridian soils are on high stream and river terraces. These soils are well drained and are nearly level to sloping. The surface layer is very dark grayish-brown loam about 9 inches thick. The subsoil is dark-brown to dark yellowish-brown loam that grades with depth to sandy loam and is strongly acid to very strongly acid. It is underlain at a depth of about 30 inches by brownish-yellow medium sand.

The minor soils in this association are Trempe, Dunnville, Trempealeau, Whitehall, Downs, Huntsville, Worthen, Lawson, Wallkill, Houghton, Palms, Eleva, and Boone soils; Loamy alluvial land; and Sandy alluvial land. Excessively drained to moderately well drained Trempe, Dunnville, Trempealeau, and Whitehall soils are generally on low terraces adjacent to the rivers. Well-drained Downs soils are on slightly concave valley benches. Well drained to poorly drained Huntsville, Worthen, Lawson, and Wallkill soils are in concave areas near drainageways on valley bottoms. Excessively drained and well-drained Boone and Eleva soils are in steep and very steep, convex areas in valleys. Houghton and Palms soils, Loamy alluvial land, and Sandy alluvial land are on valley bottoms and bottom lands along rivers and streams.

Natural fertility is low in the Trempe, Dunnville, Boone, and Eleva soils and medium or high in the other soils of this association. The available water capacity is low to moderate in these soils. The hazards of streambank and gully erosion are severe in the silty soils of this association that are along streams or in drainageways.

Most areas of these soils are used for crops or pasture. Corn is the main crop. The corn is used mainly to feed dairy herds or other livestock. Some strawberries and truck garden crops are grown on loam, sandy loam, and loamy sand soils of the Trempe, Dunnville, Trempealeau, and Billett series. Vegetable and fruit crops are irrigated in a few areas. Most areas of Palms, Houghton, and Wallkill soils and some areas of Ettrick soils are used for pasture or as wildlife habitat, but where these soils are adequately drained, corn is generally grown.

4. *Stony and rocky land-Seaton-Palsgrove, clayey subsoil variant, association*

Excessively drained to well drained soils that have a subsoil of loam, silt loam, silty clay loam, or clay; shallow and deep over limestone and sandstone; on uplands

This association consists of gently sloping to very steep soils on uplands. Peripheral to the limestone ridgetops are steep, stony and rocky escarpments that drop sharply down to moderately steep valley slopes. The difference in elevation from the ridgetops to the valley bottoms ranges from 300 to 400 feet. Most of this association is moderately steep or steeper. Some gently sloping areas occur, however, on the ridgetops (fig. 5).

This association occupies about 16 percent of the county. Stony and rocky land makes up about 20 percent of the association, Seaton soils 20 percent, Palsgrove soils, clayey subsoil variant, 10 percent, and minor soils the remaining 50 percent.

Stony and rocky land consists of steep escarpments peripheral to limestone ridgetops. These soils are excessively drained to well drained. About 20 percent of the surface is exposed rock. The surface layer is very dark brown to very dark grayish-brown silt loam 1 to 4 inches thick. The subsoil is dark-brown to yellowish-brown sandy loam, loam, or silt loam that ranges from neutral to strongly alkaline. It is underlain at a depth of 6 to 20 inches by sandstone, limestone, and chert rock.

Seaton soils are in concave areas on valley slopes. These soils are well drained and are gently sloping to steep. In cultivated areas the surface layer is dark grayish-brown silt loam about 7 inches thick. The subsoil is dark yellowish-brown silt loam and heavy silt loam that is strongly acid. It is underlain at a depth of about 41 inches by brown silt loam.

Palsgrove soils, clayey subsoil variant, are on the

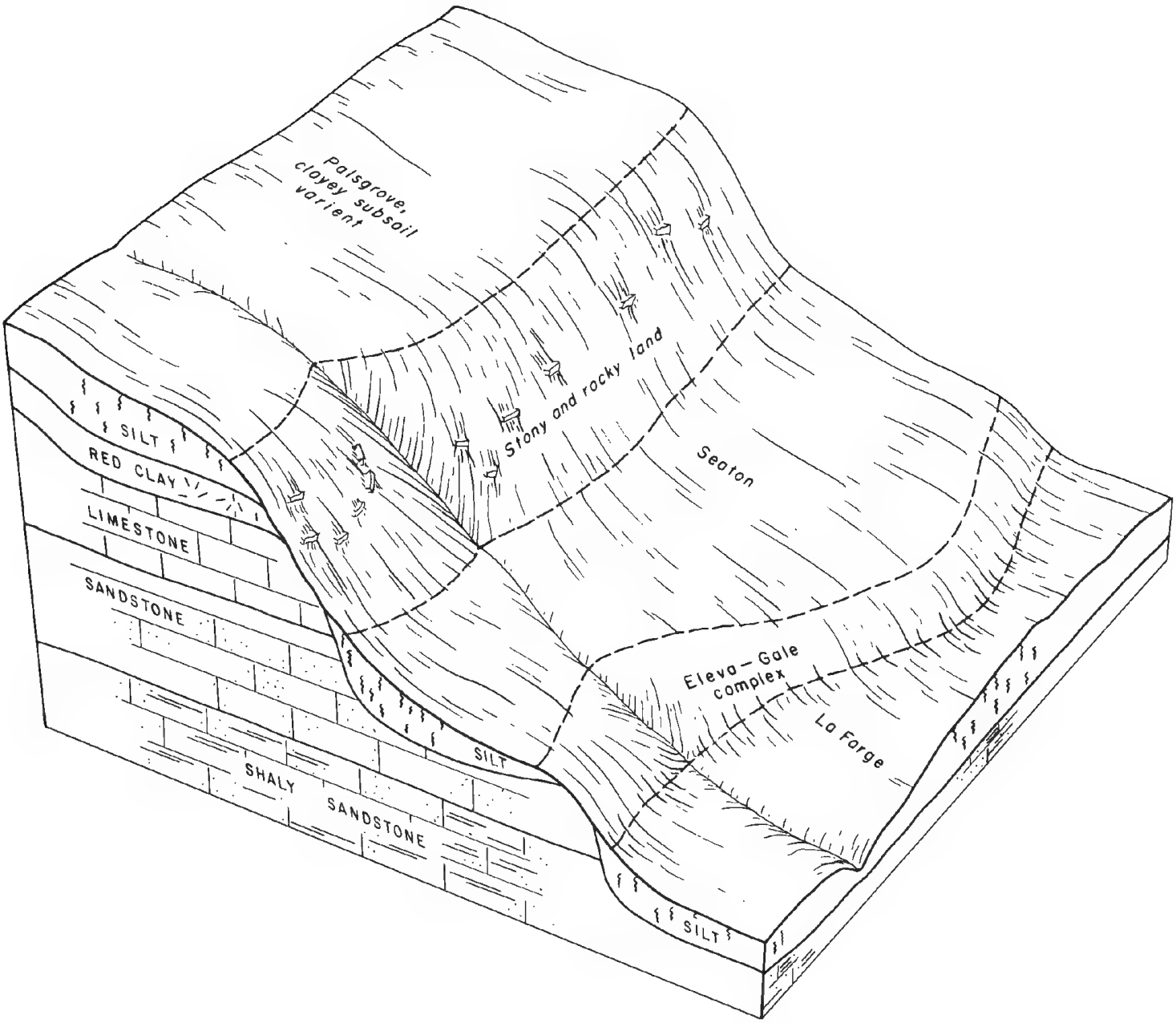

Figure 5.—**Topography, major soils, and underlying material in association 4.**

top and sides of limestone ridges. In cultivated areas the surface layer is very dark grayish-brown to dark-brown silt loam about 6 inches thick. The subsoil is brown, strongly acid silty clay loam that grades with depth to reddish-brown and dark-brown, mildly alkaline clay. It is underlain at a depth of about 40 inches by yellowish-red clay residuum weathered from limestone.

The minor soils in this association are Boone, Eleva, Hixton, Gale, Urne, La Farge, Fayette, Port Byron, and Palsgrove soils. Excessively drained to well-drained Boone, Eleva, Hixton, Gale, and Urne soils are generally in moderately steep to very steep, convex areas on uplands. Well-drained, nearly level to moderately steep La Farge, Fayette, and Palsgrove soils are on the top and sides of ridges. Well-drained Port Byron soils are in concave areas in valleys.

Natural fertility and available water capacity are very low to low in Boone and Eleva soils. Natural fertility is medium in Hixton and Gale soils, and available moisture capacity is moderate. Natural fertility is medium to high in Palsgrove soils, clayey subsoil variant, and in Palsgrove, Fayette, Seaton, and Port Byron soils. Available water capacity is moderate in these soils. The hazard of water erosion is severe on the moderately steep to steep soils of this association.

Large gullies are common on Seaton and Port Byron soils.

Most areas of the Palsgrove soils, clayey subsoil variant, and Palsgrove soils, and some of the Fayette, Seaton, Port Byron, and Gale soils that are gently sloping to moderately steep, are used for crops and pasture. Corn, oats, and alfalfa hay are the main crops. These crops are used to feed dairy herds or other livestock. Most of the steep and moderately steep areas of Boone, Eleva, Gale, and Hixton soils and Stony and rocky land are used for trees, for wildlife habitat, and for watershed management. Large limestone quarries are in this association. Most of the limestone is crushed for road fill.

5. Houghton-Palms association

Very poorly drained organic soils over organic and loamy sediment; along drainageways on valley bottoms

This association consists of nearly level valley bottoms along the Tamarack Creek (fig. 6).

This association occupies about 2 percent of the county. Houghton soils make up about 50 percent of the association, Palms soils 20 percent, and minor soils the remaining 30 percent.

Houghton soils are on valley bottoms along the upper end of streams and small rivers. These soils are very poorly drained and nearly level. The surface layer is very dark brown muck about 8 inches thick. The subsoil is very dark brown muck that is neutral in reaction. It is underlain at a depth of about 28 inches by very dark gray and black muck that has many partly decomposed plant fibers.

Palms soils are on valley bottoms along the upper end of streams and small rivers. These soils are very poorly drained and nearly level. The surface layer is black muck about 4 inches thick. The subsoil is black muck that is slightly acid. It is underlain at a depth of about 32 inches by black silt loam.

The minor soils in this association are Ettrick soils, clayey subsoil variant; Ettrick, Wallkill, Huntsville, Eleva, and Gale soils; and Wet alluvial land. Ettrick

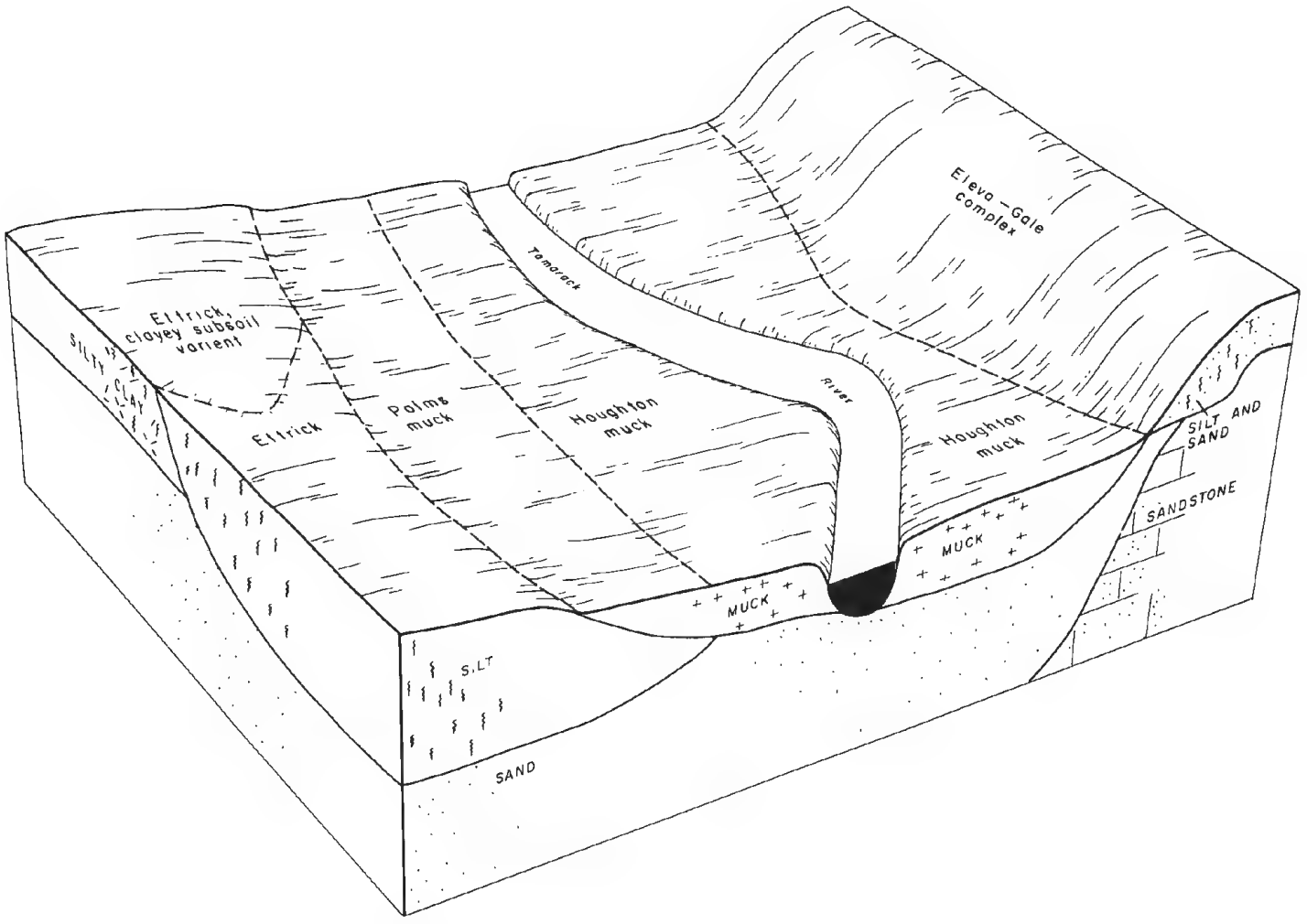

Figure 6.—**Topography, major soils, and underlying material in association 5.**

soils, clayey subsoil variant, and Ettrick, Wallkill, and Huntsville soils are on the lower end of valley bottoms and in areas near valley side slopes. Small areas of moderately steep and steep Eleva and Gale soils are on valley side slopes. Wet alluvial land is on some flood plains along streams and small rivers.

Natural fertility ranges from low to medium in Wet alluvial land and Palms and Houghton soils and high in Ettrick soils, clayey subsoil variant, and Ettrick soils. The hazard of soil blowing and susceptibility to peat fires are severe on the Houghton and Palms soils. The hazards of streambank erosion and flooding by stream overflow are severe for most of the soils in this association.

These soils are used for crops, pasture, wildlife, and water storage areas. Where drainage is maintained, corn is the main crop. Most of the corn is used to feed dairy herds and other livestock.

The native vegetation was tamarack. Much of the natural vegetation has been destroyed by drainage, cultivation, burning, and grazing.

6. *Downs-Boaz-Muscatine association*

Well drained to poorly drained soils that have a subsoil of silt loam and silty clay loam over silt loam; on valley benches and valley bottoms

This association consists of nearly level to moderately steep valley benches and valley bottoms. Most of this association is nearly level to gently sloping. It is steeper, however, on valley benches adjacent to the uplands (fig. 7).

This association occupies about 7 percent of the county. Downs soils make up about 35 percent of the association, Boaz soils 10 percent, Muscatine soils 10 percent, and minor soils the remaining 45 percent.

Downs soils are on valley benches. These soils are well drained and are nearly level to moderately steep. In cultivated areas the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsoil is dark yellowish-brown to yellowish-brown silt loam and silty clay loam that is medium acid. It is underlain at a depth of about 51 inches by yellowish-brown silt loam.

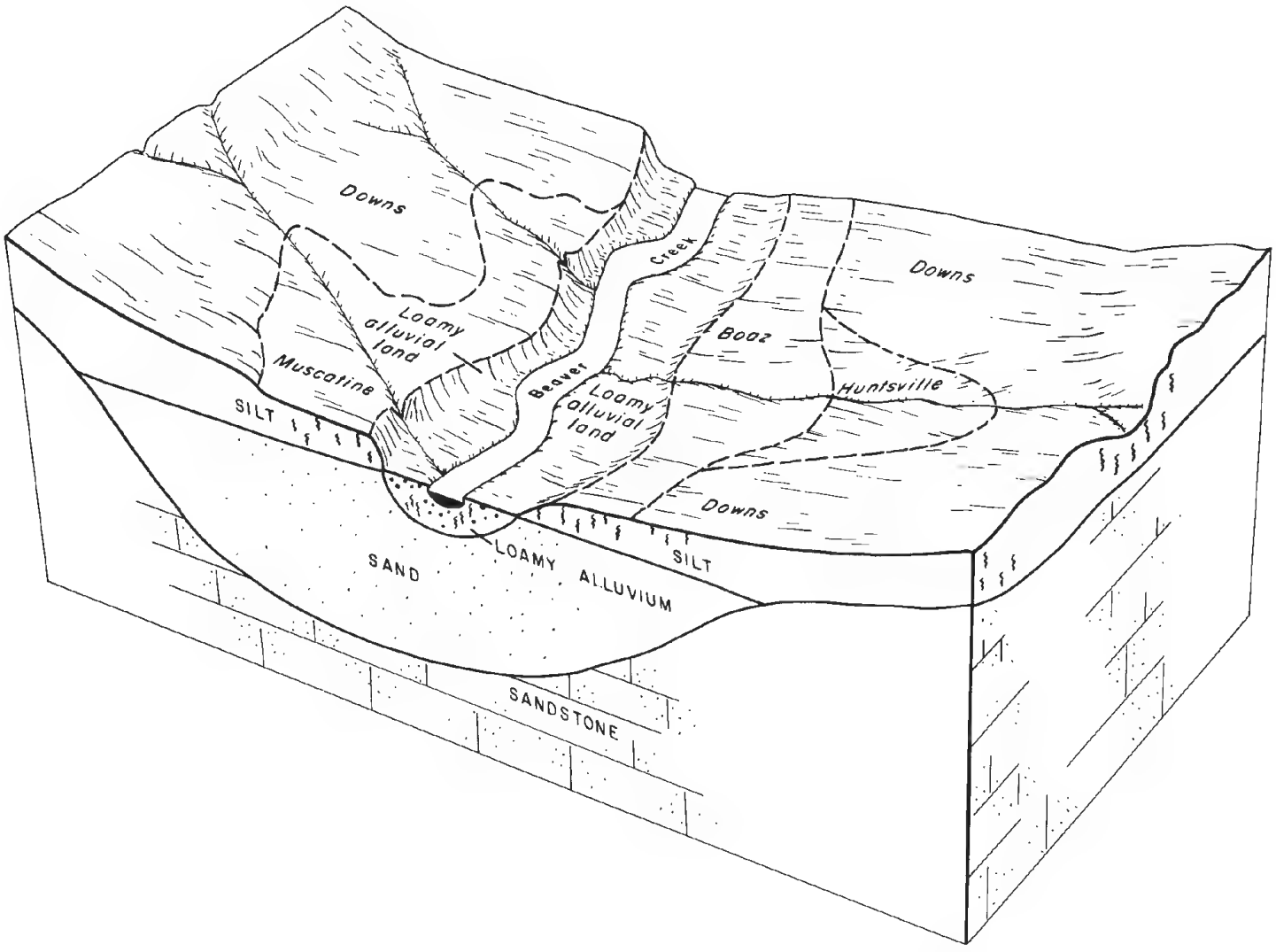

Figure 7.—**Topography, major soils, and underlying material in association 6.**

Boaz soils are on high valley bottoms. These soils are somewhat poorly drained to poorly drained and are nearly level. In cultivated areas the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsoil is brown and grayish-brown, medium acid silt loam that has dark-brown mottles. It is underlain at a depth of about 38 inches by light brownish-gray silt loam.

Muscatine soils are on valley benches. These soils are somewhat poorly drained and nearly level. The surface layer is very dark grayish-brown and very dark brown silt loam about 15 inches thick. The subsoil is brown to grayish-brown, slightly acid to strongly acid silt loam and silty clay loam that has grayish-brown to yellowish-red mottles. It is underlain at a depth of about 45 inches by grayish-brown silt loam.

The minor soils in this association are Seaton, Port Byron, Pillot, Huntsville, and Ettrick soils and Loamy alluvial land and Loamy terrace escarpments. Well-drained Seaton and Port Byron soils are on sloping to steep, concave valley benches. Well-drained Pillot soils are in nearly level to sloping areas along high stream and river terraces. Well-drained to poorly drained Huntsville and Ettrick soils are in nearly level areas along the upper end of valley bottoms. Loamy alluvial land is on bottom lands and flood plains along streams and rivers. Loamy terrace escarpments occur as long, narrow, steep fronts of terraces along streams and rivers.

Natural fertility and the available water capacity are high in most of the soils in this association. The major management concerns are maintenance of structure, fertility, and drainage in wet areas. Growing row crops year after year has deteriorated the structure of many areas of the Downs, Muscatine, and Boaz soils. Rapid runoff from the adjacent uplands creates severe hazards of flooding and erosion on the silty soils, especially those along French and Beaver Creeks.

Most of these soils are in crops, mainly corn. Corn is used to feed dairy herds and other livestock. A large acreage of green peas and sweet corn is also grown. Many wet areas are used as pasture.

7. *Wet alluvial land-Marsh association*

Poorly drained soils, and very poorly drained soils under shallow water in places; on bottom lands and flood plains along rivers and streams

This association consists of nearly level, poorly drained alluvial sediment and areas of shallow water on bottom lands along streams and rivers. It is steeper and is well drained, however, in a few places along terrace escarpments (fig. 8).

This association occupies about 3 percent of the county. Wet alluvial land makes up about 50 percent of this association, Marsh 25 percent, and minor soils the remaining 25 percent.

Wet alluvial land consists of light-colored and dark-colored, stratified sediment deposited by floodwater. These soils are mainly poorly drained fine sandy loam, loam, and silt loam that is slightly acid to mildly alkaline. They are underlain at a depth of 4 to 10 feet by loose sand.

Marsh consists of shallow-water areas underlain by alluvial or organic sediment. Additional flooding by stream and river overflow occurs in wet seasons.

The minor soils in this association are Sparta soils, mottled subsoil variant; Sparta and Morocco soils; and Sandy alluvial land, Loamy alluvial land, Loamy terrace escarpments, and Sandy terrace escarpments. Well-drained to somewhat poorly drained Sparta soils, mottled subsoil variant, and Sparta and Morocco soils are generally in low, nearly level to gently sloping areas on river and stream terraces. Sandy alluvial land and Loamy alluvial land are on nearly level bottom lands along rivers and streams. Loamy terrace escarpments and Sandy terrace escarpments occur as long, narrow, steep terrace fronts adjacent to the bottom lands of rivers and streams.

Natural fertility and the response of crops are low on these soils.

Most of the soils in this association are in brush, lowland hardwoods, and marsh vegetation. A few small areas, mainly the Sparta soils, mottled subsoil variant, are used for pasture or crops. Most other areas are used as wildlife habitat, mainly for waterfowl and furbearers. These areas are natural resting and feeding places for waterfowl using the Mississippi flyway.

8. *Dickinson-Gotham-Sparta association*

Excessively drained to well drained soils that have a subsoil of loamy sand to fine sandy loam over fine to coarse sand; on river terraces

This association consists of a nearly level to moderately steep high river terrace along the Mississippi and Black Rivers. Most of this association is nearly level or gently sloping. It is steeper, however, along Sandy terrace escarpments on Trempealeau Mountain in Perrot State Park, and on sand dunes.

This association occupies about 6 percent of the county. Dickinson soils make up about 30 percent of the association, Gotham soils 25 percent, Sparta soils 15 percent, and minor soils the remaining 30 percent.

Dickinson soils in most places occupy that part of the terrace midway between the river and the uplands. These soils are well drained and are nearly level to gently sloping. The surface layer is very dark brown and dark-brown fine sandy loam about 18 inches thick. The subsoil is dark yellowish-brown, strongly acid fine sandy loam that grades with depth to dark-brown loamy fine sand. It is underlain at a depth of about 32 inches by loose, dark yellowish-brown fine sand.

Gotham soils are in areas of the terrace that are nearer to the Mississippi and Black Rivers than areas of Dickinson soils. These soils are somewhat excessively drained and are nearly level to moderately steep. In cultivated areas the surface layer is very dark grayish-brown loamy fine sand about 9 inches thick. The subsoil is brown to dark-brown loamy sand that is strongly acid. It is underlain at a depth of about 36 inches by loose, light yellowish-brown medium sand.

Sparta soils generally are in areas nearer to the Mississippi and Black Rivers than Dickinson and Gotham soils. These soils are excessively drained and are nearly level to sloping. The surface layer is very dark grayish-brown loamy sand about 16 inches thick. The subsoil is brown loamy sand that is strongly acid. It is underlain at a depth of about 30 inches by loose, brownish-yellow coarse and medium sand.

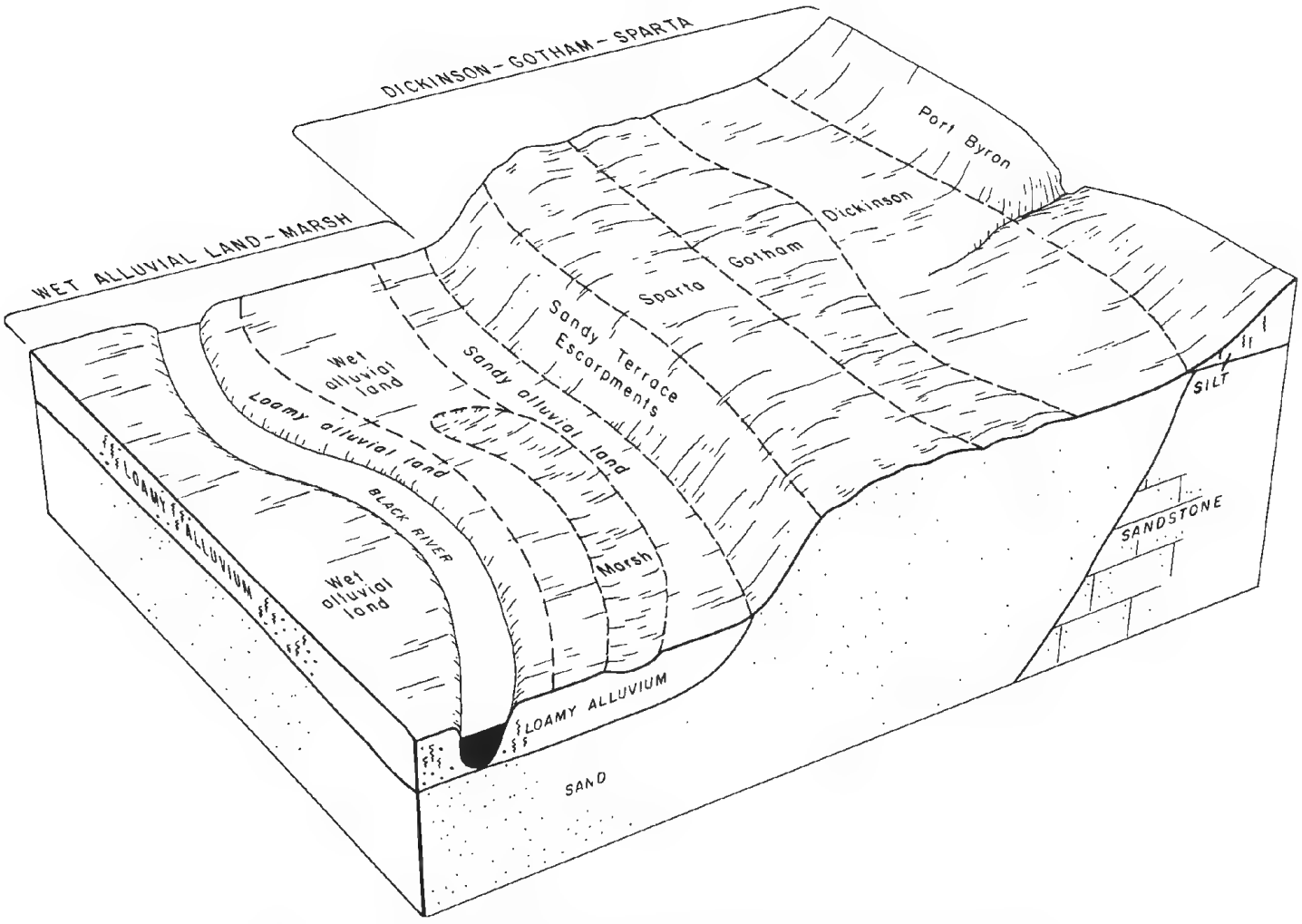

***Figure 8.*—Topography, major soils, and underlying material in associations 7 and 8.**

The minor soils in this association are Denrock soils, wet subsoil variant; Denrock, Boone, Eleva, Port Byron, and Gale soils; and Stony and rocky land and Terrace escarpments. Somewhat poorly drained Denrock soils and poorly drained Denrock soils, wet subsoil variant, are in an ancient slack-water basin on the Mississippi River terrace. Excessively drained to well-drained Boone, Eleva, and Gale soils and Stony and rocky land are in steep and very steep upland areas of Trempealeau Mountain in Perrot State Park. Well-drained Port Byron soils are in moderately steep to steep, concave valley areas.

In this association are small areas of Stony and rocky land, Seaton soils, and soils of the Eleva-Boone complex that occur mainly on Trempealeau Mountain. Trempealeau Mountain is located at the confluence of the Trempealeau and Mississippi Rivers.

Natural fertility is low in most of the soils in this association. Available water capacity is low in Dickinson, Gotham, and Sparta soils. The hazard of soil blowing is severe on Dickinson, Gotham, and Sparta soils.

Most of these soils are in crops. Corn, soybeans, and special cash crops, such as lima beans and peas, are the main crops. Large, level fields are suitable for cash crop farming, which is the main enterprise in this area. Irrigation from deep wells is planned by a few farmers to increase crop production.

Descriptions of the Soils

This section describes the soil series and mapping units in Trempealeau County. Each soil series is described in detail, and then, briefly, each mapping unit in that series. Unless specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile; that is, the sequence of layers from the surface downward to rock or other underly-

ing material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second is much more detailed and is for those who need to make thorough and precise studies of soils. The profile described in the series is representative for mapping units in that series. If the profile of a given mapping unit is different from the one described for the series, these differences are stated in describing the mapping unit, or they are differences that are apparent in the name of the mapping unit. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Loamy alluvial land and Marsh, for example, do not belong to a soil series, but, nevertheless, they are listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit, woodland group, and wildlife group in which the mapping unit has been placed. The page for the description of each capability unit, woodland group, or wildlife group can be found by referring to the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*7*).[1]

Billett Series

The Billett series consists of nearly level to moderately steep, well-drained soils on terraces along the larger streams and rivers throughout the county. These soils formed in coarse, loamy sediment underlain by deep, loose sand (fig. 9). The native vegetation was oak savanna.

In a representative profile the plow layer is very dark grayish-brown fine sandy loam about 9 inches thick. The subsoil is about 21 inches thick. It is dark-brown to brown heavy fine sandy loam in the upper part and brown fine sandy loam in the lower part. It is underlain by yellowish-brown to brownish-yellow fine and medium sand.

Permeability is moderately rapid to a depth of about 30 inches and rapid below that depth. Available water capacity and natural fertility are low. Most of the subsoil is medium acid to strongly acid.

Most areas of these soils are nearly level to sloping and are used for corn, oats, alfalfa, and other cultivated crops common to the county. The steeper areas are suited to hay, pasture, and trees.

Representative profile of Billett fine sandy loam, 2 to 6 percent slopes, in a cornfield on a high terrace, 150 yards south of the junction of County Highways D and H in NW¼NW¼ sec. 29, T. 24 N., R. 8 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; some dark-brown (10YR 4/3) root channels; moderate, coarse and medium, subangular blocky structure; friable; some roots; slightly acid; clear, smooth boundary.

B1—9 to 17 inches, dark-brown (10YR 4/3) heavy fine sandy loam; some very dark grayish-brown (10YR 3/2) root channels; moderate, coarse and medium, subangular blocky structure; some roots; slightly acid; clear, smooth boundary.

***Figure 9.*—Profile of a Billett fine sandy loam on a high terrace along the Trempealeau River.**

[1] Italic numbers in parentheses refer to Literature Cited, p. 119.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Billett fine sandy loam, 0 to 2 percent slopes	1,850	0.4
Billett fine sandy loam, 2 to 6 percent slopes	9,700	2.1
Billett fine sandy loam, 6 to 12 percent slopes, eroded	3,950	.8
Billett fine sandy loam, 12 to 20 percent slopes, eroded	1,250	.4
Boaz silt loam, 0 to 3 percent slopes	3,750	.8
Boone loamy sand, 2 to 6 percent slopes	720	.2
Boone loamy sand, 6 to 12 percent slopes, eroded	1,150	.2
Boone loamy sand, 12 to 30 percent slopes, eroded	3,700	.8
Denrock silt loam	600	.1
Denrock silt loam, wet subsoil variant	650	.1
Dickinson fine sandy loam, 0 to 2 percent slopes	3,150	.7
Dickinson fine sandy loam, 2 to 6 percent slopes	4,650	1.0
Dickinson loam, 0 to 3 percent slopes	1,200	.3
Downs silt loam, 0 to 2 percent slopes	2,950	.6
Downs silt loam, 2 to 6 percent slopes	6,500	1.4
Downs silt loam, 6 to 12 percent slopes, eroded	2,400	.5
Downs silt loam, 12 to 20 percent slopes, eroded	800	.2
Dunnville fine sandy loam, 0 to 2 percent slopes	630	.1
Dunnville fine sandy loam, 2 to 6 percent slopes	3,000	.6
Dunnville fine sandy loam, 6 to 12 percent slopes	410	.1
Eleva sandy loam, 2 to 6 percent slopes, eroded	1,700	.4
Eleva sandy loam, 6 to 12 percent slopes, eroded	8,300	1.8
Eleva sandy loam, 12 to 20 percent slopes, eroded	6,700	1.4
Eleva sandy loam, 20 to 30 percent slopes, eroded	3,300	.7
Eleva-Boone complex, 20 to 45 percent slopes	17,700	3.8
Eleva-Gale complex, 20 to 30 percent slopes	40,700	8.6
Ettrick silt loam	12,900	2.8
Ettrick silt loam, clayey subsoil variant	600	.1
Fayette silt loam, 2 to 6 percent slopes	2,400	.5
Fayette silt loam, 6 to 12 percent slopes	1,400	.3
Fayette silt loam, 6 to 12 percent slopes, eroded	11,100	2.3
Fayette silt loam, 12 to 20 percent slopes	1,450	.3
Fayette silt loam, 12 to 20 percent slopes, eroded	16,600	3.5
Fayette silt loam, 12 to 20 percent slopes, severely eroded	1,900	.4
Fayette silt loam, 20 to 30 percent slopes	3,400	.7
Gale silt loam, 2 to 6 percent slopes	500	.1
Gale silt loam, 6 to 12 percent slopes	900	.2
Gale silt loam, 6 to 12 percent slopes, eroded	2,000	.4
Gale silt loam, 12 to 20 percent slopes	950	.2
Gale silt loam, 12 to 20 percent slopes, eroded	7,500	1.6
Gale silt loam, shallow, 6 to 12 percent slopes, eroded	470	.1
Gale silt loam, shallow, 12 to 20 percent slopes, eroded	810	.2
Gale silt loam, shallow, 20 to 30 percent slopes, eroded	920	.2
Gotham loamy fine sand, 0 to 2 percent slopes	920	.2
Gotham loamy fine sand, 2 to 6 percent slopes	11,000	2.3
Gotham loamy fine sand, 6 to 12 percent slopes	3,150	.7
Gotham loamy fine sand, 12 to 20 percent slopes, eroded	1,350	.3
Gotham-Sparta loamy fine sands, 12 to 20 percent slopes	850	0.2
Gullied land	520	.1
Hixton loam, 2 to 6 percent slopes, eroded	930	.2
Hixton loam, 6 to 12 percent slopes, eroded	2,600	.5
Hixton loam, 12 to 20 percent slopes, eroded	4,150	.9
Hixton loam, 20 to 30 percent slopes, eroded	3,600	.8
Hixton loam, 30 to 45 percent slopes	15,000	3.2
Houghton muck	5,600	1.2
Huntsville silt loam, 0 to 3 percent slopes	6,700	1.4
Kato loam, sandy loam variant	960	.2
Kato silt loam, 0 to 3 percent slopes	1,700	.4
La Farge silt loam, 2 to 6 percent slopes, eroded	2,100	.4
La Farge silt loam, 6 to 12 percent slopes, eroded	9,800	2.1
La Farge silt loam, 12 to 20 percent slopes, eroded	16,400	3.5
La Farge silt loam, 20 to 35 percent slopes	2,200	.5
La Farge silt loam, 20 to 30 percent slopes, eroded	4,000	.9
Lawson silt loam, 0 to 3 percent slopes	3,400	.7
Loamy alluvial land	11,300	2.4
Loamy terrace escarpments	3,250	.7
Marsh	4,000	.9
Meridian loam, 0 to 2 percent slopes	1,150	.2
Meridian loam, 2 to 6 percent slopes	6,300	1.3
Meridian loam, 6 to 12 percent slopes, eroded	900	.2
Morocco loamy sand, 0 to 3 percent slopes	550	.1
Muscatine silt loam, 0 to 3 percent slopes	3,100	.7
Norden loam, 4 to 12 percent slopes, eroded	1,100	.2
Norden loam, 12 to 20 percent slopes, eroded	740	.2
Norden silt loam, 2 to 6 percent slopes, eroded	1,100	.2
Norden silt loam, 6 to 12 percent slopes, eroded	1,600	.3
Norden silt loam, 12 to 20 percent slopes, eroded	4,500	1.0
Norden silt loam, 20 to 30 percent slopes, eroded	2,400	.5
Palms muck	2,000	.4
Palsgrove silt loam, 2 to 6 percent slopes	380	.1
Palsgrove silt loam, 6 to 12 percent slopes, eroded	560	.1
Palsgrove silt loam, 12 to 20 percent slopes, eroded	690	.1
Palsgrove silt loam, clayey subsoil variant, 2 to 6 percent slopes	580	.1
Palsgrove silt loam, clayey subsoil variant, 6 to 12 percent slopes	1,850	.4
Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes	1,650	.4
Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes, eroded	1,200	.3
Palsgrove silt loam, clayey subsoil variant, 20 to 30 percent slopes	1,450	.3
Palsgrove soils, clayey subsoil variant, 12 to 20 percent slopes, severely eroded	550	.1
Pillot silt loam, 0 to 2 percent slopes	660	.1
Pillot silt loam, 2 to 6 percent slopes	5,500	1.2
Pillot silt loam, 6 to 12 percent slopes, eroded	910	.2
Port Byron silt loam, 2 to 6 percent slopes	530	.1
Port Byron silt loam, 6 to 12 percent slopes, eroded	1,050	.2
Port Byron silt loam, 12 to 20 percent slopes, eroded	2,400	.5
Port Byron silt loam, 20 to 30 percent slopes	1,700	.4
Sandy alluvial land	2,500	.5
Sandy terrace escarpments	720	.2
Seaton silt loam, 2 to 6 percent slopes	850	.2
Seaton silt loam, 6 to 12 percent slopes	1,000	.2
Seaton silt loam, 6 to 12 percent slopes, eroded	2,700	.6

TABLE 1.—*Approximate acreage and proportionate extent of the soils*—Continued

Soil	Acres	Percent	Soil	Acres	Percent
Seaton silt loam, 12 to 20 percent slopes, eroded	13,300	2.8	Urne fine sandy loam, 20 to 30 percent slopes, eroded	1,650	0.3
Seaton silt loam, 20 to 30 percent slopes	2,900	.6	Urne fine sandy loam, 30 to 45 percent slopes	1,250	.3
Seaton silt loam, 20 to 30 percent slopes, eroded	6,200	1.3	Urne silt loam, 6 to 12 percent slopes, eroded	730	.2
Shiffer loam, 0 to 3 percent slopes	1,000	.2	Urne silt loam, 12 to 20 percent slopes, eroded	800	.2
Sparta loamy sand, 0 to 2 percent slopes	1,800	.4	Urne silt loam, 20 to 30 percent slopes, eroded	1,100	.2
Sparta loamy sand, 2 to 6 percent slopes	8,900	1.9	Urne-Norden complex, 12 to 20 percent slopes, eroded	1,100	.2
Sparta loamy sand, 6 to 12 percent slopes	2,900	.6	Urne-Norden complex, 20 to 30 percent slopes	8,100	1.7
Sparta loamy fine sand, mottled subsoil variant, 0 to 3 percent slopes	1,200	.3	Urne-Norden complex, 30 to 45 percent slopes	10,500	2.2
Stony and rocky land	15,780	3.4	Wallkill silt loam, 0 to 3 percent slopes	1,500	.3
Trempe loamy sand, 0 to 2 percent slopes	590	.1	Wet alluvial land	8,800	1.9
Trempe loamy sand, 2 to 6 percent slopes	930	.2	Whitehall silt loam, 0 to 3 percent slopes	3,000	.6
Trempealeau loam, 0 to 3 percent slopes	1,200	.3	Worthen silt loam, 0 to 3 percent slopes	2,600	.6
Trempealeau loam, mottled subsoil variant, 0 to 3 percent slopes	1,100	.2	Total	470,340	100.0
Urne fine sandy loam, 2 to 6 percent slopes	700	.1			
Urne fine sandy loam, 6 to 12 percent slopes, eroded	1,600	.3			
Urne fine sandy loam, 12 to 20 percent slopes, eroded	1,550	.3			

B2t—17 to 25 inches, brown (7.5YR 4/4) heavy fine sandy loam; moderate, coarse and medium, subangular blocky structure; thin patchy clay films and clay bridging; friable; medium acid; clear, smooth boundary.

B3—25 to 30 inches, brown (7.5YR 4/4) fine sandy loam; weak, coarse, subangular blocky structure; vesicular; friable; strongly acid; clear, smooth boundary.

C1—30 to 40 inches, yellowish-brown (10YR 5/4) fine and medium sand; loose; single grained; medium acid; gradual boundary.

C2—40 to 60 inches, brownish-yellow (10YR 6/6) medium sand; loose; single grained; medium acid.

The solum ranges from 24 to 36 inches in thickness. The Ap horizon is fine sandy loam or sandy loam that ranges from dark brown (10YR 3/3) to black (10YR 2/1). The Ap horizon ranges from 6 to 10 inches in thickness. It commonly is medium acid or slightly acid, but it is neutral in limed fields. The Bt horizon ranges from sandy loam to light loam in texture. In some areas loamy bands 1 to 6 inches thick are in the loose, sandy substratum. Some areas adjacent to sandstone uplands are underlain by sandstone bedrock at a depth of slightly more than 60 inches.

Billett soils are adjacent to Eleva, Sparta, and Meridian soils. Billett soils are not underlain by sandstone bedrock as is typical of Eleva soils. They have a weak horizon of clay accumulation and more silt and clay than Sparta soils. Billett soils have more sand and less clay and silt than Meridian soils.

Billett fine sandy loam, 0 to 2 percent slopes (BlA).—This soil is in irregularly shaped areas on stream terraces. It has a profile similar to the one described as representative of the series, but the surface layer has more fine sand, and the subsoil is slightly thicker.

Included with this soil in mapping are a few areas of well drained and moderately well drained Meridian soils and well drained Dickinson soils that have loamy bands in the substratum. Also included are small areas of soils that are slightly more sloping than this Billett soil.

Available water capacity is low in this soil. The hazard of soil blowing is moderate. Percolation of effluent from septic tanks is restricted where thick, loamy bands are in the substratum.

Most areas of this soil are used for corn and soybeans. This soil is suited to corn, soybeans, beans, and peas. Capability units IIIs–4; woodland group 3; wildlife group 3.

Billett fine sandy loam, 2 to 6 percent slopes (BlB).—This soil is in irregularly shaped areas on stream and river terraces. It has the profile described as representative for the series.

Included with this soil in mapping are a few areas of well-drained Sparta, Gotham, Meridian, and Dickinson soils that have thick, loamy bands in the substratum and a few areas of moderately well drained, loamy soils. Also included are small areas of soils that are either more or less sloping than this Billett soil.

This soil has low available water capacity. The hazard of water erosion is slight, and the hazard of soil blowing is moderate. Percolation of effluent from septic tanks is restricted where thick, loamy bands are in the substratum.

Most areas of this soil are used for corn and soybeans. This soil is suited to corn, soybeans, oats, and alfalfa. Capability unit IIIs–4; woodland group 3; wildlife group 3.

Billett fine sandy loam, 6 to 12 percent slopes, eroded (BlC2).—This soil is in irregularly shaped areas on stream and river terraces. Some of the original surface layer has been lost through water erosion and soil blowing.

Included with this soil in mapping are small areas of well-drained Eleva soils that have convex slopes. Also included are a few areas of Gotham, Meridian, and Dickinson soils that have thick, loamy bands in the substratum.

This soil has low available water capacity. The hazards of water erosion and soil blowing are moderate. Percolation of effluent from septic tanks is restricted where thick, loamy bands are in the substratum.

Most areas of this soil are used for crops and pasture. This soil is suited to alfalfa, grasses, and limited

amounts of corn and soybeans. Capability unit IIIe–7; woodland group 3; wildlife group 3.

Billett fine sandy loam, 12 to 20 percent slopes, eroded (BlD2).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is lighter in color and the subsoil is thinner.

Included with this soil in mapping are small areas of soils that have a thick, dark surface layer and a few small areas of Eleva soils. Also included are a few small areas of somewhat poorly drained loamy soils and loamy sand soils that are underlain by a sandy substratum that has loamy bands.

This soil has low available water capacity. The hazard of water erosion is severe, and the hazard of soil blowing is moderate.

Most areas of this soil are used for pasture and hay. This soil is well suited to grasses, alfalfa, and pine tree plantations. Capability unit IVe–7; woodland group 3; wildlife group 3.

Boaz Series

The Boaz series consists of nearly level to gently sloping, somewhat poorly drained and poorly drained soils on high valley bottoms. The soils formed in silty alluvium. The native vegetation was moist-land grasses, tall shrubs, and a few trees, such as silver maple, elm, and ash.

In a representative profile the plow layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is grayish-brown, platy silt loam 7 inches thick that has reddish-brown mottles. In many cultivated areas, most of the subsurface layer is incorporated into the surface layer. The subsoil is silt loam about 22 inches thick. It is brown silt loam that has dark-brown mottles in the upper 6 inches and grayish-brown heavy silt loam that has dark-brown mottles in the lower 16 inches. It is underlain by light brownish-gray silt loam that has many dark-brown mottles.

Permeability is moderate, but percolation of water is slow in wet seasons. Available water capacity is very high, and natural fertility is high. The subsoil is medium acid. The water table is seasonally high for short periods in areas where water is concentrated by runoff and stream overflow. The water table is deep enough in most areas to permit tillage late in spring. Tile drains, shallow surface drains, and water diversions permit earlier tillage.

Most areas of these soils are used for corn. These soils are well suited to corn if drainage is adequate.

Representative profile of Boaz silt loam, 0 to 3 percent slopes, in a cornfield near a ditchbank, 250 yards east of the road in NW¼NW¼ sec. 36, T. 19 N., R. 8 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, subangular blocky structure; friable; many roots; slightly acid; abrupt, smooth boundary.

A2—9 to 16 inches, dark grayish-brown (10YR 4/2) silt loam that has few, distinct reddish-brown (5YR 4/4) mottles; moderate, thin, platy structure; very friable; medium acid; clear, smooth boundary.

B1—16 to 22 inches, brown (10YR 5/3) silt loam that has common, fine, prominent, dark-brown (7.5YR 5/2) and strong-brown (7.5YR 5/6) mottles; moderate, medium, platy structure that parts to weak, medium and fine, subangular blocky; friable; medium acid; clear, smooth boundary.

B2g—22 to 38 inches, grayish-brown (10YR 5/2) heavy silt loam that has many medium, prominent, strong-brown (7.5YR 4/4) mottles; moderate, thick, platy structure that parts to moderate, coarse and medium, subangular blocky; friable; medium acid; clear, smooth boundary.

C—38 to 60 inches, light brownish-gray (2.5YR 6/2) silt loam that has many, coarse, prominent, dark-brown (7.5YR 4/4) mottles; massive; slightly acid.

The solum ranges from 30 to 40 inches in thickness. The Ap horizon is very dark grayish-brown (10YR 3/2) or very dark gray (10YR 3/1) in color and ranges from 6 to 10 inches in thickness. The Ap horizon commonly is slightly acid, but in limed areas it is neutral in reaction. The Bg horizon is silt loam. It has a hue of 10YR or 2.5Y, a value of 4, 5, or 6, and a chroma of 2 or less.

Boaz soils are adjacent to areas of Loamy alluvial land and to Ettrick soils. They are generally somewhat poorly drained and have a slightly lighter colored surface layer than the poorly drained Ettrick soils, and they do not have the B2t horizon that is characteristic of those soils. They have a B horizon that lacks the stratification of Loamy alluvial land, and the B horizon has a stronger structure than that of Loamy alluvial land.

Boaz silt loam, 0 to 3 percent slopes (BmA).—This soil is in uniformly shaped areas on high valley bottoms. Recent silt washed from areas on uplands or the mixing of the surface layer and subsoil during cultivation causes some areas to be lighter in color.

Included with this soil in mapping are a few small areas of poorly drained Ettrick soils and Loamy alluvial land.

Erosion caused by runoff and stream overflow is a moderate to severe hazard in cultivated areas. Streambank erosion is a severe hazard in cultivated and pastured areas. Most areas are wet for short periods, but they can be cultivated without tile drains because the water table is at a depth of more than 3 feet most of the year.

Most areas of this soil are used for corn. This soil is well suited to corn. Drainage is adequate. Capability unit IIw–13; woodland group 9; wildlife group 5a.

Boone Series

The Boone series consists of gently sloping to steep, excessively drained soils on sandstone uplands. These soils formed in sandy residuum underlain by cemented sandstone bedrock (fig. 10). The native vegetation was mainly black oak savanna.

In a representative profile the surface layer is very dark grayish-brown loamy sand about 4 inches thick. The subsoil is yellowish-brown loamy sand about 11 inches thick. It is underlain by yellowish-brown to pale-brown sand about 10 inches thick. Beneath the loose sand is yellowish-brown cemented sandstone bedrock.

Permeability is rapid. Natural fertility is low, and available water capacity is very low. The subsoil is strongly acid.

Most areas of these soils are used for pasture or as woodland. A few areas, however, are used for corn, oats, and hay. Most areas are too steep and droughty for crops.

Representative profile of Boone loamy sand, 12 to

Figure 10.—Area of a Boone soil underlain by cemented sandstone.

30 percent slopes, in black oak woods, in the NE¼SE¼ sec. 22, T. 24 N., R. 7 W.:

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, fine, crumb structure; very friable; very strongly acid; clear, wavy boundary.

B2—4 to 15 inches, yellowish-brown (10YR 5/4) loamy sand; weak, medium, subangular blocky structure; very friable; strongly acid; clear, irregular boundary.

C1—15 to 20 inches, yellowish-brown (10YR 5/6) fine sand that has yellowish-brown (10YR 5/6) angular pieces of sandstone; loose; single grained; strongly acid; clear, wavy boundary.

C2—20 to 25 inches, very pale brown (10YR 7/4) sand; loose; single grained; strongly acid; clear, wavy boundary.

IIR—25 to 60 inches, yellowish-brown (10YR 5/8) cemented sandstone bedrock.

The solum ranges from 7 to 20 inches in thickness. Depth to bedrock ranges from 20 to 40 inches.

Where present, the Ap horizon is lighter colored than the A horizon and ranges from 6 to 8 inches in thickness. The A horizon is very dark gray (10YR 3/1), very dark grayish brown (10YR 3/2), or very dark brown (10YR 2/2) and ranges from 1 to 4 inches in thickness. The A horizon commonly is very strongly acid, but it is slightly acid or neutral in limed fields.

Boone soils are adjacent to Eleva and Hixton soils and Stony and rocky land. They have less clay and more sand than Hixton and Eleva soils, which formed in sandstone residuum. Boone soils have more sand and less silt, clay, and rock than Stony and rocky land.

Boone loamy sand, 2 to 6 percent slopes (BnB).—This soil is in uniformly shaped areas on ridgetops and in valleys. It has a profile similar to the one described as representative of the series, but in cultivated areas the surface layer is thicker and lighter colored. Also, depth to bedrock is slightly greater.

Included with this soil in mapping are a few areas of loamy fine sand and fine sandy loam. Also included are a few areas of soils that have a darker surface layer than this soil, and they are mainly in trees.

This soil has very low available water capacity. The hazard of soil blowing is severe.

This soil is suited to alfalfa and grasses or to pine tree plantations. A few areas are used for corn, oats, and soybeans. Capability unit IVs–3; woodland group 4; wildlife group 3.

Boone loamy sand, 6 to 12 percent slopes, eroded (BnC2).—This soil is in uniformly shaped areas on ridgetops and in valleys. It has a profile similar to the one described as representative of the series, but in cultivated areas the surface layer is thicker and lighter colored.

Included with this soil in mapping are a few areas of loamy fine sand and sandy loam. Also included are small wooded areas of soils that have a thinner, darker surface layer than this soil and some areas of rock outcrop.

This soil has very low available water capacity. The hazard of water erosion is moderate, and the hazard of soil blowing is severe.

This soil is suited to alfalfa and grasses for pasture or to pine tree plantations. Capability unit VIs–3; woodland group 4; wildlife group 3.

Boone loamy sand, 12 to 30 percent slopes, eroded (BnE2).—This soil is in uniformly shaped areas on ridges and valleys. It has the profile described as representative for the series.

Included with this soil in mapping are some areas of cultivated soils that have a thicker, lighter colored surface layer than this soil and small areas that have rock outcrop. Also included are a few areas of sandy loam and areas of soils that are slightly more sloping than this Boone soil.

This soil has very low available water capacity. The hazards of soil blowing and water erosion are severe.

Most areas of this soil are wooded. The moderately steep areas are well suited to pine tree plantations. Capability unit VIIs–3; woodland group 4; wildlife group 3.

Denrock Series

The Denrock series consists of nearly level, somewhat poorly drained soils in an ancient slack-water basin on a large terrace along the Mississippi River. These soils formed mainly in clayey slack-water sediment that is 4 to 6 feet thick. Beneath the clayey sediment is loose sand. The native vegetation was prairie grasses, tall shrubs, and a few trees, such as silver maple, elm, and ash.

In a representative profile the surface layer is about 11 inches thick. The upper 8 inches is black silt loam, and the lower 3 inches is very dark gray, granular silty clay loam. The subsoil is very firm silty clay about 31 inches thick. It is dark-brown silty clay in the upper part and reddish-brown to red silty clay that has gray mottles in the lower part. It is underlain by about 8 inches of reddish-brown silty clay. Beneath the silty clay is dark yellowish-brown fine and medium sand at a depth of about 50 inches.

Permeability is slow. Available water capacity and natural fertility are high. During wet periods, mainly early in spring, these soils are wet and very sticky in areas where runoff water concentrates. A perched water table hinders cultivation during wet seasons, but most areas of these soils can be tilled late in spring. Shallow surface drains and water diversions improve drainage and permit tillage earlier in spring. The subsoil is medium acid to slightly acid.

Most areas of Denrock soils are cultivated. These soils are well suited to corn and to other row crops where drainage is adequate.

Representative profile of Denrock silt loam, in a cornfield on the boundary between the NE¼ and SE¼ in SW¼ sec. 5, T. 18 N., R. 9 W.:

Ap—0 to 8 inches, black (10YR 2/1) silt loam; medium, coarse, granular structure; firm; slightly plastic; common roots; strongly acid; abrupt, smooth boundary.

A12—8 to 11 inches, very dark gray (10YR 3/1) silty clay loam; moderate, medium, platy structure that parts to strong, fine, granular; firm; slightly plastic; common roots; strongly acid; clear, wavy boundary.

B1t—11 to 18 inches, dark-brown (10YR 4/3) silty clay; strong, medium, angular blocky structure that parts to fine, angular blocky; few continuous clay films on ped faces; very firm; plastic; few roots; strongly acid; clear, wavy boundary.

B2t—18 to 33 inches, reddish-brown (2.5YR 4/4) silty clay that has common, coarse, distinct, gray (10YR 5/1) mottles; moderate, medium, prismatic structure that parts to strong, angular blocky; ped faces coated with many, thick, continuous clay films; very firm; very plastic; slightly acid; gradual, irregular boundary.

B3—33 to 42 inches, reddish-brown to weak-red (2.5YR 4/4 to 4/2) silty clay that has common, coarse, distinct, gray (10YR 5/1) mottles; weak, medium, prismatic structure that parts to strong, coarse, angular blocky; plastic; neutral; gradual, irregular boundary.

C1—42 to 50 inches, reddish-brown (5YR 4/3) silty clay that has few thin bands of fine sand; weak, platy structure that parts to moderate, medium, subangular blocky; plastic; mildly alkaline; abrupt, smooth boundary.

IIC2—50 to 60 inches, dark yellowish-brown (10YR 4/4) fine and medium sand, weakly stratified; loose; single grained; neutral.

The solum ranges from 3 to 4 feet in thickness. The clayey sediment ranges from 4 to 6 feet in thickness.

The A horizon is black (10YR 2/1), very dark brown (10YR 2/2), or very dark gray (10YR 3/1) heavy silt loam that ranges from 10 to 12 inches in thickness. The A horizon commonly is medium acid or strongly acid, but it is neutral in limed fields. The B2t and B3 horizons have hues of 2.5YR, 5YR, and 7.5YR; values of 4 and 5; and chromas of 2, 3, and 4. Mottles in the B2t and B3 horizons have a hue of 10YR, values of 4, 5, and 6, and a chroma of 2 or less.

Denrock soils are adjacent to Denrock soils, wet subsoil variant, and to Dickinson and Sparta soils. Denrock soils are better drained and have a thinner A horizon than Denrock soils, wet subsoil variant. They have less sand than Dickinson and Sparta soils.

Denrock silt loam (Dc).—This soil is nearly level. It is on uniformly shaped knolls in clayey, slack-water basins on terraces of the Mississippi River.

Included with this soil in mapping are a few areas of poorly drained, wet soils.

Permeability is slow. This soil has a seasonally perched water table. Most areas are wet after heavy rains and early in spring. Shallow surface drains and water diversions help to improve drainage and permit tillage earlier in spring.

Most areas of this soil are well suited to corn if drainage is adequate. Capability unit IIw–2; woodland group 7; wildlife group 5a.

Denrock Series, Wet Subsoil Variant

The Denrock series, wet subsoil variant, consists of nearly level, poorly drained soils in an ancient slack-water basin on a large terrace along the Mississippi River. These soils formed mainly in grayish-brown and reddish-brown, clayey, slack-water sediment 4 to 6 feet thick. Beneath the clayey sediment is loose sand. The native vegetation was wetland prairie grasses, tall shrubs, and a few trees, such as silver maple, elm, and ash.

In a representative profile the surface layer is very dark gray silt loam 12 inches thick. The subsoil is about 32 inches thick. In sequences from the top, it is very dark gray silty clay loam that has yellowish-brown mottles, grayish-brown silty clay that has red mottles, and reddish-brown silty clay that has a few grayish-brown mottles. Beneath the subsoil is about 6 inches of massive, mildly alkaline, dark yellowish-brown silty clay that is underlain by loose, weakly stratified, reddish-brown sand.

Permeability is slow. Available water capacity and natural fertility are high. These soils have a seasonally perched water table. They are wet and sticky in areas where water is concentrated from runoff and stream overflow, during spring thaw, and after heavy rains. Ditches and water diversions permit tillage earlier in spring during wet periods. The subsoil is mainly mildly alkaline.

Most areas of Denrock soils, wet subsoil variant, are cultivated. Where improved drainage is maintained, these soils are well suited to corn.

Representative profile of Denrock silt loam, wet subsoil variant, in a cornfield, 100 yards west of road in NW¼SE¼ sec. 8, T. 18 N., R. 9 W.:

Ap—0 to 8 inches, very dark gray (10YR 3/1) silt loam; weak, medium, subangular blocky structure; friable when moist; neutral; abrupt, smooth boundary.

A12—8 to 12 inches, very dark gray (10YR 3/1) heavy silt loam; moderate, fine, granular structure; firm when moist; neutral; clear, wavy boundary.

B1tg—12 to 19 inches, very dark gray (10YR 3/1) silty clay loam that has few, fine, prominent, yellowish-brown (10YR 5/4) mottles; moderate, medium, prismatic structure that parts to medium, subangular blocky; few, thin, patchy clay films on ped faces; plastic; slightly acid; gradual, irregular boundary.

B2tg—19 to 30 inches, grayish-brown (2.5Y 5/2) silty clay that has many fine, prominent, red (2.5YR 5/6) mottles; strong, medium, prismatic structure that parts to strong, medium, subangular blocky; many, thick, continuous clay films on horizontal and vertical ped faces; reddish-brown (5YR 4/3) ped interiors; plastic; mildly alkaline; gradual, irregular boundary.

B3—30 to 44 inches, reddish-brown (2.5YR 4/4) silty clay; few, fine, prominent, grayish-brown (2.5Y 5/2) mottles; moderate, medium, platy structure; plastic; mildly alkaline; clear, smooth boundary.

C1—44 to 50 inches, reddish-brown (2.5YR 4/4) silty clay; massive; plastic; mildly alkaline; clear, smooth boundary.

IIC2—50 to 60 inches, dark yellowish-brown (10YR 4/4) medium and fine sand; weakly stratified; loose; single grained; neutral.

The solum ranges from 3 to 4 feet in thickness. The clayey sediment ranges from 4 to 6 feet in thickness.

The Ap horizon is very dark brown (10YR 2/2) or very dark gray (10YR 3/1). The A horizon ranges from 10 to 20 inches in thickness. It is neutral to slightly acid. The Btg horizon has hues of 2.5Y and 10YR, values of 4, 5, and 6, and chromas of 2 or less. The clay sediment in the B3 horizon and the upper part of the C horizon has hues of 2.5YR, 5YR, and 7.5YR and values and chromas of 3, 4, and 5.

Denrock soils, wet subsoil variant, are adjacent to Denrock, Dickinson, and Sparta soils. Denrock soils, wet subsoil variant, are more poorly drained and have a thicker A horizon than Denrock soils. They have less sand and more clay and silt than the well-drained Dickinson and Sparta soils.

Denrock silt loam, wet subsoil variant (De).—This soil is nearly level. It is in uniformly shaped areas in depressions that consist of clayey, slack-water deposits on terraces of the Mississippi River.

Included with this soil in mapping are a few small areas of somewhat poorly drained Denrock soils.

Permeability is slow in the upper 50 inches of this soil and moderately rapid below a depth of 50 inches. Consequently, this soil has a seasonally perched water table. Ditches or water diversion structures help to improve drainage and permit tillage. Good tilth and structure are difficult to maintain, especially where tillage extends down into the clayey subsoil. In these areas the soil is sticky when wet and hard when dry, and tillage must be done at the proper moisture content. Most areas of this soil are subject to flooding caused by runoff and stream overflow during the thaw in spring and after heavy rains.

This soil is suited to corn where drainage is adequate. Capability unit IIw–1; woodland group 7; wildlife group 5b.

Dickinson Series

The Dickinson series consists of nearly level to gently sloping, well-drained soils on river terraces. The soils formed in coarse, loamy sediment underlain by fine sand. The native vegetation was bur oak savanna.

In a representative profile the surface layer is very dark brown and dark-brown fine sandy loam 18 inches thick. The subsoil is about 14 inches thick. It is dark yellowish-brown fine sandy loam in the upper part and dark-brown loamy fine sand in the lower part. It is underlain by dark yellowish-brown fine sand.

Permeability is moderately rapid in these soils. The subsoil is strongly acid.

Most areas of these soils are used for corn, soybeans, and lima beans.

Representative profile of Dickinson fine sandy loam, 0 to 2 percent slopes, in a soybean field, 200 feet west of county highway in the NE¼ sec. 1, T. 18 N., R. 9 W.:

Ap—0 to 10 inches, very dark brown (10YR 2/2) fine sandy loam; weak, fine, granular structure; very friable; common roots; medium acid; abrupt, smooth boundary.

A1—10 to 18 inches, dark-brown (10YR 3/3) fine sandy loam; weak, coarse, subangular blocky structure; very friable; common roots; medium acid; clear, smooth boundary.

B2—18 to 27 inches, dark yellowish-brown (10YR 3/4) fine sandy loam; weak, coarse, subangular blocky structure; very friable; few roots; strongly acid; abrupt, smooth boundary.

B3—27 to 32 inches, dark-brown (7.5YR 4/4) loamy fine

sand; weak, medium, subangular blocky structure; very friable; strongly acid; abrupt, smooth boundary.

C—32 to 60 inches, dark yellowish-brown (10YR 4/4) fine sand; loose; single grained; strongly acid.

The solum ranges from 30 to 36 inches in thickness. In a few areas the substratum is loamy sand or has loamy bands that range from 1 to 6 inches in thickness.

The A horizon is black (10YR 2/1) or dark-brown (10YR 3/3) fine sandy loam or light loam that ranges from 10 to 30 inches in thickness. The organic-matter content in the lower part of the A horizon is less than 1 percent.

Dickinson soils are adjacent to Gotham and Sparta soils. They have a thicker A horizon and more fine sand and silt than Gotham soils. Dickinson soils have more fine sand and silt than Sparta soils.

Dickinson fine sandy loam, 0 to 2 percent slopes (DkA).—This soil is in irregularly shaped areas on river terraces. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of loamy fine sand that has a loamy substratum or loamy bands in the substratum. Also included are small areas of soils that have slopes of more than 2 percent.

This soil has low available water capacity and fertility. The hazard of soil blowing is moderate. Irrigation is feasible in some large areas of this soil. Percolation of effluent from septic tanks is restricted in a few areas where thick, loamy bands are in the substratum.

This soil is suited to row and hay crops. It is commonly used for corn, soybeans, lima beans, and peas. Capability unit IIIs–4; woodland group 3; wildlife group 3.

Dickinson fine sandy loam, 2 to 6 percent slopes (DkB).—This soil is in irregularly shaped areas on river terraces. It has a profile similar to the one described as representative for the series, but the surface layer is light sandy loam and is lighter colored.

Included with this soil in mapping are a few small areas of moderately well drained sandy loam, loamy fine sand, and fine sandy loam that have a loamy substratum or loamy bands in the substratum. Also included are a few small areas of soils that are either slightly less sloping or more sloping than this Dickinson soil.

Available water capacity and fertility are low. The hazard of soil blowing is moderate. Percolation of effluent from septic tanks is restricted in a few areas where thick, loamy bands are in the substratum. Irrigation is feasible in some large areas of this soil.

This soil is suited to row and hay crops. Most areas of this soil are cultivated. It commonly is used for corn, soybeans, lima beans, and peas. Capability unit IIIs–4; woodland group 3; wildlife group 3.

Dickinson loam, 0 to 3 percent slopes (DlA).—This soil is in irregularly shaped areas in depressions and drainageways on river terraces. It has a profile similar to the one described as representative of the series, but it has slightly more silt and clay and less sand.

Included with this soil in mapping are a few small areas of soils that have slopes of more than 3 percent.

This soil has moderate available water capacity and medium fertility.

This soil is suited to row and hay crops. It is frequently used for corn, soybeans, and lima beans. Capability unit IIs–1; woodland group 12; wildlife group 4.

Downs Series

The Downs series consists of nearly level to moderately steep, well-drained soils on valley benches. The soils formed in deep silty sediment (fig. 11). The native vegetation was bur and black oak savanna.

In a representative profile the surface layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is brown, platy silt loam about 2 inches thick. The subsoil is about 40 inches thick. It is dark yellowish-brown silt loam in the upper part and yellowish-brown silty clay loam in the lower part. It is underlain by yellowish-brown silt loam.

Permeability is moderate. Natural fertility and avail-

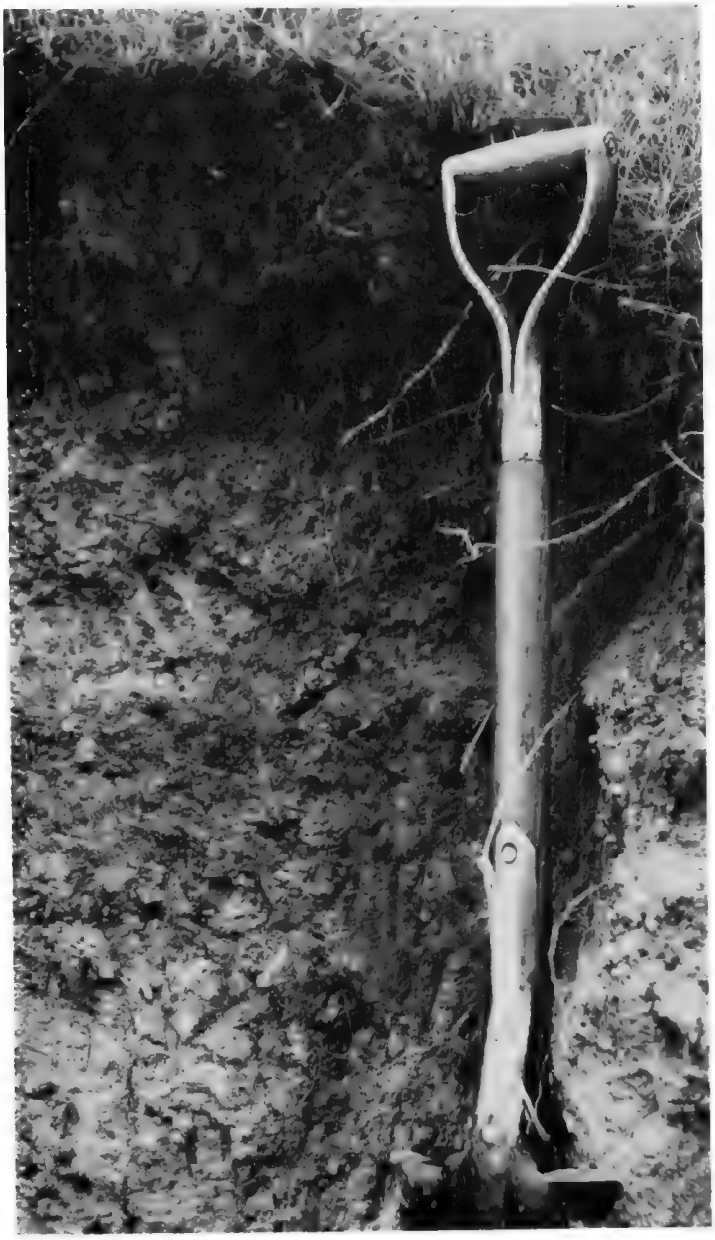

Figure 11.—**Profile of Downs silt loam.**

able water capacity are high. The subsoil is medium acid.

Most areas of Downs soils are used for corn, oats, and hay.

Representative profile of Downs silt loam, 2 to 6 percent slopes, in a pasture, 100 feet west of road and 20 feet south of Dutch Creek, in the NW¼NW¼ sec. 23, T. 19 N., R. 8 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, thin, platy and fine, granular structure; very friable; many fibrous roots; neutral, clear, smooth boundary.

A2—9 to 11 inches, brown (10YR 5/3) silt loam; weak, thin, platy structure; very friable; many fibrous roots; neutral, gradual, smooth boundary.

B1—11 to 18 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; ped faces coated with light-gray (10YR 7/2) silt particles; friable; few roots; slightly acid, gradual, smooth boundary.

B21t—18 to 31 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; ped faces coated with light-gray (10YR 7/2) silt particles and thick, patchy, dark-brown (10YR 4/3) clay films; friable; few roots; medium acid; gradual, wavy boundary.

B22t—31 to 51 inches, yellowish-brown (10YR 5/4) light silty clay loam; weak, coarse, subangular blocky structure; ped faces coated with light-gray (10YR 7/2) silt particles and thin, patchy, dark-brown (10YR 4/3) clay films; friable; medium acid; gradual, smooth boundary.

C—51 to 60 inches yellowish-brown (10YR 5/4) silt loam; massive; friable; medium acid.

The solum ranges from 38 to 55 inches in thickness. The silty sediment ranges from 4 to 10 feet in thickness.

The Ap horizon is very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2), or dark brown (10YR 3/3) and ranges from 6 to 10 inches in thickness. The A horizon is commonly medium acid or slightly acid, but it is neutral in limed fields. The Bt horizon is heavy silt loam or light silty clay loam. In some areas the lower part of the B horizon has high-chroma mottles.

Downs soils are adjacent to Muscatine, Boaz, and Ettrick soils. They are better drained than Muscatine, Boaz, and Ettrick soils and have a thinner, lighter colored A horizon than Muscatine and Ettrick soils.

Downs silt loam, 0 to 2 percent slopes (DoA).—This soil is in uniformly shaped areas on valley benches.

Included with this soil in mapping are small areas of soils that have a dark-colored surface layer more than 10 inches thick or a subsoil that has bright-colored mottles. Also included are a few small areas of soils that are underlain at a depth of slightly less than 5 feet by outwash sand.

Most areas of this soil are used for corn. This soil is well suited to row crops, but maintenance of soil structure is difficult. Capability unit I–3; woodland group 12; wildlife group 1.

Downs silt loam, 2 to 6 percent slopes (DoB).—This soil is in uniformly shaped areas on valley benches. It has the profile described as representative for the series.

Included with this soil in mapping are a few small areas of soils that have a dark surface layer more than 10 inches thick or a subsoil that has bright-colored mottles. Also included are a few small areas that are underlain at a depth of slightly less than 5 feet by outwash sand.

The hazard of water erosion is slight.

This soil is well suited to corn, oats, and alfalfa, but it is used mainly for corn. If this soil is intensively used for row crops, special management practices are needed to maintain structure and tilth. Capability unit IIe–1; woodland group 12; wildlife group 1.

Downs silt loam, 6 to 12 percent slopes, eroded (DoC2).—This soil is in uniformly shaped areas on valley benches. It has a profile similar to the one described as representative of the series, but the surface layer is thinner. The plow layer is a mixture of material from the surface layer and subsoil, and it is lighter colored and less friable than the material from the original surface layer.

Included with this soil in mapping are a few small areas of Seaton and Fayette soils along slopes on uplands, a few small areas of Port Byron and Worthen soils in drainageways, and small areas of soils that are more sloping or less sloping than this Downs soil.

The hazard of water erosion is moderate, and maintenance of tilth is difficult.

This soil is suited to oats, alfalfa, and limited amounts of corn. Capability unit IIIe–1; woodland group 12; wildlife group 1.

Downs silt loam, 12 to 20 percent slopes, eroded (DoD2).—This soil is in uniformly shaped areas on valley benches and side slopes. It has a profile similar to the one described as representative of the series, but the surface layer is thinner. Also, the subsoil is thinner and generally has more clay. In most areas the plow layer is very dark grayish brown and is mixed with less friable, dark yellowish-brown material from the subsoil.

Included with this soil in mapping are a few small areas of Seaton and Fayette soils along slopes on uplands and of Port Byron and Worthen soils in drainageways. Also included are a few small areas of soils that are more sloping or less sloping than this Downs soil.

The hazard of water erosion is severe, and maintenance of tilth is difficult.

This soil is well suited to hay and pasture crops. Many areas are used for alfalfa, hay, and pasture. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–1; woodland group 12; wildlife group 1.

Dunnville Series

The Dunnville series consists of nearly level to sloping, well-drained soils. These soils are on low terraces along the larger streams and rivers in the county. They formed in a reddish-colored, coarse, loamy sediment that is underlain by loose sand. The native vegetation was oak savanna.

In a representative profile the surface layer is dark-brown fine sandy loam about 13 inches thick. The subsoil is about 24 inches thick. It is dark reddish-brown and reddish-brown fine sandy loam in the upper part and yellowish-red loamy fine sand in the lower part. It is underlain by loose, yellowish-red fine and medium sand.

Permeability is moderately rapid. Available water capacity and natural fertility are low. The subsoil is strongly acid.

Most areas of Dunnville soils are used for corn, oats, and alfalfa.

Representative profile of Dunnville fine sandy loam, 0 to 2 percent slopes, in a cornfield on a low terrace, 450 yards north of County Highway Q and just west of driveway into farmyard in SE¼NE¼ sec. 30, T. 22 N., R. 8 W.:

Ap—0 to 8 inches, dark-brown (7.5YR 3/2) fine sandy loam; weak, medium, subangular blocky structure that parts to weak, fine, granular; very friable; strongly acid; abrupt, smooth boundary.

A12—8 to 13 inches, dark-brown (7.5YR 3/2) fine sandy loam; weak, coarse, prismatic structure that parts to weak, medium, subangular blocky; very friable; strongly acid; abrupt, smooth boundary.

B1—13 to 17 inches, dark reddish-brown (5YR 3/3) fine sandy loam; weak, coarse, prismatic structure that parts to weak, medium, subangular blocky; very friable; strongly acid; clear, wavy boundary.

B2—17 to 26 inches, reddish-brown (5YR 4/4) fine sandy loam; weak, coarse, prismatic structure; very friable; strongly acid; clear, wavy boundary.

B3—26 to 37 inches, yellowish-red (5YR 4/6) loamy fine sand; weak, coarse, prismatic structure that parts to weak, coarse, subangular blocky; very friable; strongly acid; gradual, wavy boundary.

C—37 to 60 inches, yellowish-red (5YR 4/8) fine and medium sand; single grained; loose; medium acid.

The solum ranges from 24 to 40 inches in thickness. The loose, sandy substratum has reduced iron and a few, thin, loamy bands.

The A horizon is dark-brown to dark reddish-brown sandy loam to fine sandy loam that ranges from 10 to 15 inches in thickness. It has hues of 10YR, 7.5YR, and 5YR and values and chromas of 2 and 3. The A horizon commonly is medium acid or strongly acid, but it is neutral or slightly acid in limed areas. The B2 horizon ranges from sandy loam to fine sandy loam in texture and has a reddish hue of 7.5YR, 5YR, or 2.5YR, a value of 3, or 4, and a chroma of 3 to 8.

The Dunnville soils in Trempealeau County are a few degrees warmer than is defined as within the range for the Dunnville series, but this difference does not alter their usefulness and behavior.

Dunnville soils are adjacent to Trempealeau and Trempe soils and Sandy terrace escarpments. Dunnville soils do not have a Bt horizon, and they have more sand and less silt and clay than Trempealeau soils. They have more silt and clay throughout the solum than Trempe soils. They have structure in the B horizon, which Sandy terrace escarpments lack, and they have more silt and clay than Sandy terrace escarpments.

Dunnville fine sandy loam, 0 to 2 percent slopes (DuA).—This soil is in irregularly shaped areas on low terraces. It has the profile described as representative for the series.

Included with this soil in mapping are small areas of Trempealeau and Trempe soils and Sandy terrace escarpments.

Available water capacity is low. The hazard of soil blowing is moderate. In places where this soil is in large areas, irrigation is feasible.

This soil is suited to corn, oats, and alfalfa. It is used for cash crops, such as soybeans, lima beans, and strawberries. Capability unit IIIs–4; woodland group 3; wildlife group 3.

Dunnville fine sandy loam, 2 to 6 percent slopes (DuB).—This soil is in irregularly shaped areas on low terraces. It has a profile similar to the one described as representative of the series, but in many areas the surface layer is light fine sandy loam that has more sand and less humus.

Included with this soil in mapping are a few small areas of Trempealeau and Trempe soils and of Sandy terrace escarpments.

Available water capacity is low. The hazard of soil blowing is moderate. Irrigation is feasible on some large areas of this soil.

This soil is suited to corn, oats, and alfalfa. It is used for soybeans, lima beans, and garden crops. Capability unit IIIs–4; woodland group 3; wildlife group 3.

Dunnville fine sandy loam, 6 to 12 percent slopes (DuC).—This soil is in irregularly shaped areas on knolls on low terraces. It has a profile similar to the one described as representative for the series, but the surface layer and subsoil are thinner.

Included with this soil in mapping are a few small areas of Sparta and Trempealeau soils and Sandy terrace escarpments.

Available water capacity is low. The hazards of soil blowing and water erosion are moderate.

This soil is suited to oats, alfalfa, and a limited amount of corn. It also is well suited to pine tree plantations. Capability unit IIIe–7; woodland group 3; wildlife group 3.

Eleva Series

The Eleva series consists of gently sloping to very steep, well-drained soils on sandstone ridges and valleys. These soils formed in coarse, loamy sandstone residuum underlain by cemented sandstone bedrock. In many places this sandstone formation occurs as massive escarpments along valley slopes or as knobs and narrow ridges on uplands. The native vegetation was hardwoods, mainly black oak.

In a representative profile the plow layer is dark grayish-brown sandy loam 5 inches thick. The subsoil is about 25 inches thick. It is dark yellowish-brown sandy loam in the upper part and brown sandy loam in the lower part. Beneath the subsoil is about 6 inches of yellowish-brown, loose medium and fine sand that is underlain by 10 inches of brownish-yellow, weakly cemented sandstone. This sandstone is underlain at a depth of about 46 inches by more strongly cemented sandstone bedrock.

Permeability is moderately rapid. Available water capacity and natural fertility are low. The subsoil is strongly acid.

Most areas of these soils are too steep for crops and are used for pasture or as woodland. The gently sloping to moderately steep areas are suited to corn, oats, and alfalfa.

Representative profile of Eleva sandy loam, 6 to 12 percent slopes, in a cornfield, 150 yards southeast of the northeast corner of the SE¼SW¼ sec. 30, T. 23 N., R. 7 W.:

Ap—0 to 5 inches, dark grayish-brown (10YR 4/2) sandy loam; weak, coarse, subangular blocky structure; very friable; many fine roots; medium acid; abrupt, smooth boundary.

B1—5 to 12 inches, dark yellowish-brown (10YR 4/4) sandy loam; weak, coarse and medium, subangular blocky structure; friable; many fine roots; medium acid; clear, smooth boundary.

B21t—12 to 20 inches, brown (7.5YR 4/4) heavy sandy loam; moderate, coarse, subangular blocky structure; thin patchy clay films on ped faces; very friable; common fine roots; strongly acid; clear, wavy boundary.

B22t—20 to 30 inches, brown (7.5YR 4/4) sandy loam; weak, coarse, subangular blocky structure; few, thin, patchy clay films, mostly near the upper boundary, and clay bridging of sand grains; very

friable; few fine roots; medium acid; gradual, irregular boundary.
C—30 to 36 inches, yellowish-brown (10YR 5/6) medium and fine sand; loose; single grained; strongly acid.
R1—36 to 46 inches, brownish-yellow (10YR 6/6) weakly cemented sandstone; medium acid.
R2—46 to 60 inches, brownish-yellow (10YR 6/6) medium-grained indurated sandstone bedrock.

The solum ranges from 20 to 40 inches in thickness. Depth to strongly cemented sandstone ranges from 36 to 60 inches.

The A1 horizon, where present, is very dark gray (10YR 3/1) or very dark grayish-brown (10YR 3/2) sandy loam or fine sandy loam that ranges from 1 to 4 inches in thickness. The Ap horizon is dark grayish brown (10YR 4/2) to dark brown (10YR 4/3). The Bt horizon generally ranges from sandy loam to light loam in texture.

Eleva soils are adjacent to Boone, Hixton, Gale, La Farge, Fayette, and Meridian soils. They are underlain by a more acid, coarser grained sandstone formation than La Farge soils. They have more silt and clay and are deeper than Boone soils. Eleva soils have less silt and clay than Hixton soils. They lack the moderately deep silt mantle of Gale and La Farge soils and the deep silt mantle of Fayette soils. They have slightly less silt and clay than Meridian soils and are underlain by sandstone rather than by loose sand.

Eleva sandy loam, 2 to 6 percent slopes, eroded (ElB2).—This soil is in irregularly shaped areas on valley side slopes. It has a profile similar to the one described as representative of the series, but the surface layer is slightly darker and depth to sandstone bedrock is slightly greater.

Included with this soil in mapping are a few small areas of Billett soils and of moderately well drained sandy soils that are underlain by sandstone.

This soil has low available water capacity and natural fertility. The hazard of soil blowing is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to corn, oats, and alfalfa. Control of erosion and maintenance of organic-matter content are good management practices. Capability unit IIIs–4; woodland group 3; wildlife group 1.

Eleva sandy loam, 6 to 12 percent slopes, eroded (ElC2).—This soil is in irregularly shaped areas on valley side slopes. It has the profile described as representative for the series.

Included with this soil in mapping are a few areas of moderately well drained sandy loams and small areas of Billett soils. Also included are small areas of soils that have a surface layer that is darker colored than the surface layer of this Eleva soil.

This soil has low available water capacity and natural fertility. The hazard of erosion is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, grasses, and a limited amount of corn. Control of erosion and maintenance of organic-matter content are good management practices. Capability unit IIIe–7; woodland group 3; wildlife group 1.

Eleva sandy loam, 12 to 20 percent slopes, eroded (ElD2).—This soil is in irregularly shaped areas on valley side slopes. It has a profile similar to the one described as representative for the series, but depth to bedrock is less.

Included with this soil in mapping are small areas of Boone and Hixton soils. Also included are a few areas of soils that have a dark-colored surface layer and areas of severely eroded soils.

This soil has a low available water capacity. The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to grasses, alfalfa, and pine tree plantations. Most areas are in pasture. Control of erosion and maintenance of organic-matter content are good management practices. Capability unit IVe–7; woodland group 3; wildlife group 1.

Eleva sandy loam, 20 to 30 percent slopes, eroded (ElE2).—This soil is in irregularly shaped areas on the sides of ridges and valleys. It has a profile similar to the one described as representative for the series, but the surface layer is thinner and generally darker, and depth to bedrock is less.

Included with this soil in mapping are small areas of Boone, Hixton, and Gale soils.

This soil has low available water capacity and natural fertility. The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

Most of this soil is in pasture. This soil is suited to red and white pines. Control of erosion and maintenance of organic-matter content are good management practices. Capability unit VIe–7; woodland group 3; wildlife group 1.

Eleva-Boone complex, 20 to 45 percent slopes (EnF).—The soils in this complex are on sandstone ridges and valley slopes throughout the county. Eleva soils are in concave areas in or near drainageways or on the lower end of valleys, and Boone soils are on convex knobs or on the steeper parts of valleys (fig. 12). These soils are so intermingled and are in areas so small that it is impractical to map them separately. Eleva soils make up about 60 percent of the acreage, and Boone soils make up 40 percent. The native vegetation was hardwoods, mainly black oak.

Eleva soils have a profile similar to the one described as representative for the Eleva series, but they are not so deep, the surface layer is very dark grayish-brown sandy loam or loam 1 to 4 inches thick, and the subsoil has less clay and a structure that is not so well defined. Boone soils have a profile similar to the one described as representative for the Boone series.

Included with this complex in mapping are a few small areas of Urne, Hixton, Gale, and Seaton soils. These areas are generally less than 2 acres in size.

The available water capacity is low in Eleva soils and very low in Boone soils. The hazard of erosion is severe.

The soils in this complex are too steep to be cultivated. They are well suited to use as wildlife habitat. They are also well suited to red and white pine trees of medium to good quality and to hardwoods of poor quality, such as red and black oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIIe–7; woodland group 3; wildlife group 3.

Eleva-Gale complex, 20 to 30 percent slopes (EoE).—The soils in this complex are on sandstone ridges and on the sides of valleys throughout the county. Eleva soils have convex slopes, and Gale soils have concave slopes and generally are near drainageways. These soils are so intermingled and the areas are so

Figure 12.—**Area of Eleva-Boone complex.**

small that it is impractical to map them separately. Eleva soils make up about 55 percent of the acreage, and Gale soils make up 45 percent. Some areas of this complex have a thin or moderately deep silt mantle. Native vegetation was hardwoods, mainly red and black oaks.

The Eleva soils have a profile similar to the one described as representative for the Eleva series, but they are not so deep. Also, the surface layer is very dark grayish brown, is 1 to 4 inches thick, and has more silt or very fine sand in a few areas. The Gale soils have a profile similar to the one described as representative for the Gale series, but their surface layer is very dark brown and is 1 to 4 inches thick. Also, their subsoil is not so deep and has more sand and less clay.

Included with this complex in mapping are small areas of Seaton and Worthen soils in drainageways; many areas of Gale soils, shallow phase; and some areas of Hixton soils.

Available water capacity is low in Eleva soils and medium in Gale soils. The hazard of erosion is severe.

The soils in this complex are mainly in pasture or woodland. They are especially well suited to red and white pine trees of good quality and to red and black oaks of medium to good quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIe–2; woodland group 1; wildlife group 1.

Ettrick Series

The Ettrick series consists of nearly level, poorly drained soils on valley bottoms. These soils formed in deep silty alluvium. The native vegetation was wetland prairie grasses, tall shrubs, and a few trees, such as silver maple, elm, and ash.

In a representative profile the plow layer is very dark gray silt loam 12 inches thick. The subsoil is about 26 inches thick. It is grayish-brown silt loam that has many brown and brownish-gray mottles in the upper part and light brownish-gray silty clay loam that has brown mottles in the lower 21 inches. It is underlain by grayish-brown silt loam that has many strong-brown mottles.

Permeability is moderately slow, but percolation of water is slow where the water table is high. Available water capacity and natural fertility are high. The subsoil is neutral in reaction. These soils are wet where water is concentrated during stream overflow and

when runoff is received during thaws in spring and heavy rains. Where the ground water level has been lowered by stream entrenchment, these soils can be tilled without artificial drainage. Tile drains, shallow surface drains, and water diversions will permit earlier tillage and help to drain wet spots.

Most areas of Ettrick soils are in corn. These soils are well suited to corn where drainage is adequate.

Representative profile of Ettrick silt loam, in a cornfield in a narrow, nearly level valley bottom along a small stream, 250 feet west of the road in NE¼SW¼ sec. 4, T. 21 N., R. 9 W.:

Ap—0 to 12 inches, very dark gray (10YR 3/1) silt loam, weak, medium and very fine, subangular blocky structure; friable; common roots; neutral; abrupt, smooth boundary.

B1g—12 to 17 inches, grayish-brown (2.5Y 5/2) silt loam that has many, medium, prominent, strong-brown (7.5YR 5/6 to 5/8) and light brownish-gray (2.5Y 6/2) mottles; weak, coarse, prismatic structure that parts to moderate, fine, subangular blocky; friable; common roots; neutral; clear, wavy boundary.

B2tg—17 to 38 inches, light brownish-gray (2.5Y 6/2) silty clay loam that has many, medium, prominent, strong-brown (7.5YR 5/6 to 5/8) mottles; weak, coarse, prismatic structure that parts to moderate, medium, subangular blocky; few, thin, continuous, light brownish-gray (2.5Y 6/2) clay films on ped faces; slightly plastic; few, soft iron concretions in the lower 4 inches; common roots; neutral; clear, wavy boundary.

Cg—38 to 60 inches, grayish-brown (2.5Y 5/2) silt loam that has many, large, prominent, strong-brown (7.5YR 5/6 to 5/8) mottles; massive; neutral.

The solum ranges from 34 to 42 inches in thickness. The silty alluvium ranges from 4 to 12 feet in thickness. It is underlain by stratified silt and fine sand.

The A horizon is very dark brown (10YR 2/2), very dark gray (10YR 3/1), or black (10YR 2/1) and ranges from 10 to 20 inches in thickness. The Btg horizon is heavy silt loam or silty clay loam that has a hue of 10YR or 2.5Y, a value of 4, 5, or 6, and a chroma of 2 or less.

Ettrick soils are adjacent to Pillot, Houghton, Palms, and Lawson soils. They have poorer drainage and thicker silt loam sediment than Pillot soils. They formed in silty alluvium, and Houghton and Palms soils typically formed in organic sediment. Ettrick soils have a Bg horizon that is absent in Lawson soils, and they have a thinner A horizon than those soils.

Ettrick silt loam (Er).—This soil is nearly level and occurs in uniformly shaped areas on valley bottoms. Included in mapping are a few small areas of wet soils and small areas of Palms and Lawson soils.

The hazard of streambank erosion is severe in cultivated and pastured areas. During the time that areas of this soil have been farmed, the local groundwater level has been lowered 2 to 3 feet by stream entrenchment, and many areas are now cultivated without artificial drainage. Tile drains, shallow surface drains, and diversions permit earlier tillage and help to drain wet spots.

Most areas of this soil are in corn. This soil is well suited to corn where drainage is adequate. Capability unit IIw–1; woodland group 9; wildlife group 5b.

Ettrick Series, Clayey Subsoil Variant

The Ettrick series, clayey subsoil variant, consists of nearly level, poorly drained soils in an ancient drainageway near side slopes at the lower end of Tamarack Valley. The soils formed in dark-colored clayey alluvium that is underlain by loose sand at a depth of between 3 and 4 feet. The native vegetation was wetland prairie grasses, tall shrubs, and a few trees, such as silver maple and elm.

In a representative profile the surface layer is black heavy silt loam and silty clay loam about 16 inches thick. The subsoil is about 30 inches thick. It is very dark gray silty clay that has dark yellowish-brown mottles in the upper part, very dark grayish-brown silty clay that has dark-brown mottles in the middle part, and dark grayish-brown silty clay loam that has dark-brown mottles in the lower part. It is underlain by loose, dark grayish-brown sand.

Permeability is moderately slow. Available water capacity and natural fertility are high. The subsoil is neutral. These soils are wet and sticky where water is concentrated by runoff and stream overflow. A perched water table hinders cultivation during wet seasons, but most of the year these soils can be tilled without drainage. Shallow surface drains and water diversions permit tillage early in spring.

Most areas of Ettrick soils, clayey subsoil variant, are used for corn. These soils are well suited to row crops where drainage is adequate.

Representative profile of Ettrick silt loam, clayey subsoil variant, in a soybean field, 200 yards southwest of the northeast corner of SW¼ sec. 34, T. 19 N., R. 9 W.:

Ap—0 to 8 inches, black (10YR 2/1) heavy silt loam; moderate, medium, subangular blocky structure that parts to moderate, medium and fine, granular; friable; neutral; abrupt, smooth boundary.

A3—8 to 16 inches, black (10YR 2/1) silty clay loam; strong, medium, prismatic structure; friable; sticky; neutral; clear, smooth boundary.

B21t—16 to 26 inches, very dark gray (10YR 3/1) silty clay that has very thin dark-gray (10YR 4/1) lamellae; common, medium, prominent, yellowish-red (5YR 4/6) mottles; moderate, coarse and medium, subangular blocky; few, thin, patchy clay films on ped faces; firm, plastic; neutral; clear, smooth boundary.

B22tg—26 to 32 inches, very dark grayish-brown (2.5YR 3/2) silty clay that has common, medium, prominent, dark-brown (7.5YR 4/4) mottles; moderate, coarse and medium, subangular blocky structure; many, thin, patchy clay films on ped faces; plastic; neutral; gradual, smooth boundary.

B3t—32 to 46 inches, dark, grayish-brown (2.5YR 4/2) silty clay loam that has common, medium, prominent, dark-brown (7.5YR 4/4) mottles; moderate, medium, prismatic structure that parts to moderate, medium, subangular blocky; few, thin, patchy, very dark brown (10YR 2/2) clay films on ped faces; sticky; neutral; gradual, smooth boundary.

IIC—46 to 60 inches, dark grayish-brown (2.5YR 4/2) sand; loose; single grained; medium acid.

The solum ranges from 36 to 48 inches in thickness and is neutral in reaction. The alluvium commonly has a few, thin, sandy bands.

The A horizon is black (10YR 2/1) heavy silt loam or silty clay loam that ranges from 12 to 24 inches in thickness. Most of the Bt horizon is clay. The Btg horizon has hues of 10YR and 2.5Y, values of 3 and 4, and a chroma of 2 or less.

Ettrick soils, clayey subsoil variant, are adjacent to Kato, Ettrick, Palms, and Houghton soils. They have more clay and less sand and silt than Kato soils. They have more clay and have thinner deposits of alluvial sediment than Ettrick soils. They formed in silty clay alluvium, but Houghton and Palms soils typically formed in organic sediment.

Ettrick silt loam, clayey subsoil variant (Et).—This

soil is in a large, ancient drainageway, about 600 acres in size, near the lower end of Tamarack Valley.

Included with this soil in mapping are a few small areas of poorly drained Kato soils and of a soil that has a surface layer of moderately well drained fine sandy loam. Also included are a few small areas of Ettrick soils.

Permeability is moderately slow. This soil has a seasonally perched water table, and it is wet early in spring and during rainy periods. Areas along streams are subject to flooding. The hazard of streambank erosion is severe in cultivated and pastured areas. Good tilth and structure are difficult to maintain, especially where tillage extends into the clayey subsoil. In these areas the soil is sticky when wet and hard when dry. Therefore, tillage must be done when the soil has the proper moisture content.

Most areas of this soil are used for corn. This soil is well suited to row crops where drainage is adequate. Capability unit IIw–1; woodland group 7; wildlife group 5b.

Fayette Series

The Fayette series consists of gently sloping to steep, well-drained soils on uplands. These soils formed in deep silty loess that is underlain at a depth of more than 60 inches by limestone or sandstone bedrock. The native vegetation was mixed hardwoods, mainly red and white oaks.

In a representative profile the plow layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is brown, platy silt loam about 5 inches thick. The subsoil is a friable layer about 30 inches thick. It is dark yellowish-brown silt loam in the upper part, brown heavy silt loam and silty clay loam in the middle part, and dark yellowish-brown heavy silt loam in the lower part. It is underlain by dark yellowish-brown silt loam.

Permeability is moderate. Available water capacity and natural fertility are high. The subsoil is medium to strongly acid.

Most of the gently sloping to moderately steep areas of these soils are used for corn, oats, and alfalfa. Steep areas are in pasture or woodland.

Representative profile of Fayette silt loam, 6 to 12 percent slopes, in a cultivated field, 220 feet north of the southwest corner of SW¼NW¼ sec. 10, T. 20 N., R. 9 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, granular structure; very friable; many fibrous roots; slightly acid; abrupt, smooth boundary.

A2—8 to 13 inches, brown (10YR 5/3) silt loam; weak, thin, platy structure; very friable; many fibrous roots; slightly acid; abrupt, smooth boundary.

B1—13 to 16 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, subangular blocky structure; friable; many fine roots; medium acid; clear, smooth boundary.

B21t—16 to 21 inches, brown (10YR 4/3) heavy silt loam; moderate, fine, subangular blocky structure; coatings of light brownish-gray (10YR 6/2) silt particles on ped faces and few, thin, patchy, dark-brown (10YR 4/3) clay films; friable; few roots; medium acid; abrupt, smooth boundary.

B22t—21 to 30 inches, brown (10YR 4/3) silty clay loam; strong, medium and coarse, subangular blocky structure; coatings of light brownish-gray (10YR 6/2) silt particles on ped faces and few, thin, continuous, dark-brown (10YR 4/3) clay films; firm; few roots; strongly acid; clear, smooth boundary.

B3—30 to 43 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; weak, coarse, subangular blocky structure that parts to massive; iron stems 1/8 to 1/2 inch in diameter; friable; medium acid; clear, smooth boundary.

C—43 to 60 inches, dark yellowish-brown (10YR 4/4) silt loam; massive; medium acid.

The solum ranges from 36 to 55 inches in thickness. The loess is 5 to 15 feet thick.

The Ap horizon ranges from very dark grayish brown (10YR 3/2) to dark grayish brown (10YR 4/2) and has a dry value of more than 5 and a chroma of more than 3. In uncultivated areas the A horizon is very dark brown (10YR 2/2) or very dark gray (10YR 3/1) and ranges from 2 to 4 inches in thickness. The A horizon commonly is medium acid or slightly acid, but it is neutral in limed areas. The lower part of the Bt horizon is silty clay loam that has a hue of 10YR, a value of 4, and a chroma of 3 or 4.

Fayette soils are adjacent to La Farge, Gale, and Seaton soils. The lower part of the B horizon of Fayette soils formed in silty loess, and that of the La Farge and Gale soils typically formed in loamy residuum from sandstone. They have more clay in the Bt horizon than Seaton soils.

Fayette silt loam, 2 to 6 percent slopes (FaB).—This soil is in irregularly shaped areas on ridgetops. It has a profile similar to the one described as representative for the series, but the surface layer is slightly darker.

Included with this soil in mapping are a few small areas of well-drained La Farge and Gale soils. Also included are a few areas of soils that have slopes of less than 2 percent.

The hazard of erosion is slight.

This soil is well suited to corn, oats, and alfalfa. It commonly is used for corn. Capability unit IIe–1; woodland group 1; wildlife group 1.

Fayette silt loam, 6 to 12 percent slopes (FaC).—This soil is in irregularly shaped areas on ridgetops. It has the profile described as representative for the series.

Included with this soil in mapping are a few small areas of La Farge, Hixton, and Gale soils. Also included are small areas of soils that are less sloping or more sloping than this Fayette soil and a few areas of soils that have a slightly darker surface layer.

The hazard of water erosion is moderate.

This soil is suited to oats, alfalfa, and limited amounts of corn. Control of erosion is a good management practice. Capability unit IIIe–1; woodland group 1; wildlife group 1.

Fayette silt loam, 6 to 12 percent slopes, eroded (FaC2).—This soil is in irregularly shaped areas on the top and sides of ridges. In areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are small areas of La Farge, Gale, and Hixton soils. Also included are a few areas of soils that have a dark surface layer and small areas of soils that are less sloping or more sloping than this Fayette soil.

The hazard of water erosion is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and limited amounts of corn. Control of erosion and maintenance

of tilth are good management practices. Capability unit IIIe–1; woodland group 1; wildlife group 1.

Fayette silt loam, 12 to 20 percent slopes (FaD).—This soil is in uniformly shaped areas on side slopes of uplands. It has a profile similar to the one described as representative for the series, but the surface layer is thinner and darker.

Included with this soil in mapping are a few small areas of Gale, La Farge, and Seaton soils. Also included are a few areas of silty soils that are underlain at a depth of about 60 inches by sand.

The hazard of water erosion is severe.

Most of this soil is in woodland and pasture. This soil is well suited to grasses and alfalfa. Control of erosion is a good management practice. Capability unit IVe–1; woodland group 1; wildlife group 1.

Fayette silt loam, 12 to 20 percent slopes, eroded (FaD2).—This soil is in uniformly shaped areas on side slopes on uplands. In areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are small areas of La Farge, Gale, and Seaton soils and a few areas of silty soils that are underlain at a depth of 60 inches by sand. Also included are small areas of soils that have a dark surface layer and small areas of soils that are less sloping or more sloping than this Fayette soil.

The hazard of water erosion is severe. Tilth and organic-matter content of the surface layer have been adversely affected by erosion.

Most of this soil is cultivated. This soil is well suited to alfalfa and grasses. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–1; woodland group 1; wildlife group 1.

Fayette silt loam, 12 to 20 percent slopes, severely eroded (FaD3).—This soil is in uniformly shaped areas on side slopes of uplands. In areas where this soil is cultivated, a large amount of material from the subsoil has been mixed with that in the plow layer.

Included with this soil in mapping are a few small areas of Gale, La Farge, and Seaton soils and a few areas of silty soils that are underlain at a depth of about 60 inches by sand. Also included are a few small areas of soils that are less sloping or more sloping than this Fayette soil.

The hazard of water erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is cultivated. It is well suited to alfalfa and grasses for pasture. It is also well suited to trees. Control of erosion and maintenance of tilth are good management practices. Capability unit VIe–1; woodland group 1; wildlife group 1.

Fayette silt loam, 20 to 30 percent slopes (FaE).—This soil is in uniformly shaped areas on side slopes of uplands. It has a profile similar to the one described as representative for the series, but the surface layer is thinner and darker colored and the subsoil has less clay and more sand.

Included with this soil in mapping are small areas of Gale, La Farge, and Hixton soils and of eroded and severely eroded Fayette soils. Also included are a few areas of soils that are less sloping or more sloping than this Fayette soil.

The hazard of water erosion is severe.

Most of this soil is in woodland and pasture. This soil is well suited to these uses. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIe–1; woodland group 1; wildlife group 1.

Gale Series

The Gale series consists of gently sloping to steep, well-drained soils on uplands. These soils formed mainly in silty loess underlain by cemented sandstone. In many places this sandstone occurs as massive cliffs along valleys or as high knobs and narrow ridges on uplands. The native vegetation was hardwoods, mainly oaks.

In a representative profile the plow layer is dark grayish-brown silt loam 8 inches thick. The subsurface layer is platy silt loam 4 inches thick. The subsoil is about 22 inches thick. It is brown heavy silt loam in the upper part and brown loam in the lower part. Beneath the subsoil is yellowish-brown loamy sand that is underlain by cemented sandstone.

Available water capacity generally is moderate, but it is low where these soils are shallow phases. Natural fertility is medium. Permeability is moderate. The subsoil is medium to strongly acid.

Most of the gently sloping to moderately steep areas of these soils are used for corn, oats, and alfalfa. Steep areas are in pasture or woodland.

Representative profile of Gale silt loam, 12 to 20 percent slopes, eroded, in a field of alfalfa, 300 yards south of road in NW¼SE¼ sec. 12, T. 23 N., R. 9 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, fine, granular structure; very friable; many roots; neutral; abrupt, smooth boundary.

A2—8 to 12 inches, brown (10YR 5/3) silt loam; weak, thin, platy structure; very friable; many roots; neutral (limed); clear, smooth boundary.

B2t—12 to 24 inches, brown (7.5YR 5/4) heavy silt loam; moderate, fine, subangular blocky structure; many, thin, continuous, dark-brown clay films on ped faces; very friable; few roots; strongly acid; gradual, smooth boundary.

IIB3—24 to 34 inches, brown (7.5YR 5/4) loam; moderate, medium, subangular blocky structure; silt coatings on ped faces; friable; few roots; medium acid; gradual, smooth boundary.

IIC—34 to 40 inches, grayish and yellowish-brown (10YR 5/2 to 5/4) loamy sand; single grained; loose; medium acid; abrupt, smooth boundary.

R—40 to 60 inches, yellowish-brown (10YR 5/4) cemented sandstone bedrock.

The solum ranges from 22 to 40 inches in thickness. The loess ranges from 20 to 34 inches in thickness.

The Ap horizon ranges from dark grayish brown (10YR 3/2) to dark yellowish brown (10YR 4/4). It has a dry value of more than 5 and a dry chroma of more than 3. In uncultivated areas the A horizon is very dark brown (10YR 2/2) or very dark gray (10YR 3/1) and ranges from 2 to 4 inches in thickness. The A horizon commonly is medium acid or slightly acid, but in limed areas it is neutral in reaction. The B horizon is brown or dark yellowish-brown heavy silt loam or silty clay loam.

Gale soils are adjacent to Fayette, La Farge, and Eleva soils. Gale soils have a moderately thick mantle of silt, which is lacking in Eleva soils. Gale soils are underlain by a more acid, coarser grained sandstone formation than

La Farge soils. They have a B horizon in which the lower part formed in loamy sandstone residuum, and the B horizon of Fayette soils does not.

Gale silt loam, 2 to 6 percent slopes (GaB).—This soil is in irregularly shaped areas on ridgetops. It has a profile similar to the one described as representative of the series, but the silt mantle is slightly thicker and the surface layer is darker.

Included with this soil in mapping are small areas of La Farge, Hixton, and Eleva soils. Also included are a few small areas of soils that are less sloping or more sloping than this Gale soil.

Available water capacity is moderate. The hazard of erosion is slight.

This soil is well suited to corn, oats, and alfalfa. It commonly is used for corn. Capability unit IIe–2; woodland group 1; wildlife group 1.

Gale silt loam, 6 to 12 percent slopes (GaC).—This soil is generally in irregularly shaped areas on tops and sides of ridges. A few larger areas are on upland benches, mainly along the larger valleys in the northern half of the county. This soil has a profile similar to the one described as representative of the series, but the surface layer is slightly darker and the silt mantle is thicker.

Included with this soil in mapping are small areas of La Farge, Hixton, and Eleva soils. Also included are a few small areas of soils that are less sloping or more sloping than this Gale soil.

Available water capacity is moderate. The hazard of water erosion is moderate.

This soil is suited to oats, alfalfa, and limited amounts of corn. Control of erosion is a good management practice. Capability unit IIIe–2; woodland group 1; wildlife group 1.

Gale silt loam, 6 to 12 percent slopes, eroded (GaC2).—This soil is generally in irregularly shaped areas on the top and sides of ridges. A few large areas, however, are on upland benches, mainly along the larger valleys in the northern half of the county. In areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few small areas of La Farge, Hixton, and Eleva soils. Also included are a few areas of soils that have a surface layer that is darker than that of this soil and a few small areas of soils that are less sloping or more sloping than this Gale soil.

Available water capacity is moderate. The hazard of water erosion is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and limited amounts of corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIIe–2; woodland group 1; wildlife group 1.

Gale silt loam, 12 to 20 percent slopes (GaD).—This soil is in uniformly shaped areas on side slopes on uplands. It has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of Hixton, Eleva, and Seaton soils. Also included are a few areas of soils that have a darker surface layer than this soil and a few small areas of soils that are less sloping or more sloping than this Gale soil.

Available water capacity is moderate. The hazard of water erosion is severe.

This soil is well suited to grasses and alfalfa. Control of erosion is a good management practice. Capability unit IVe–2; woodland group 1; wildlife group 1.

Gale silt loam, 12 to 20 percent slopes, eroded (GaD2).—This soil is in uniformly shaped areas on side slopes on uplands. In areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are small areas of Hixton, Eleva, and Seaton soils and of severely eroded Gale soils. Also included are small areas of soils that have a dark surface layer and a few small areas of soils that are less sloping or more sloping than this Gale soil.

Available water capacity is moderate, and the hazard of water erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is well suited to grasses and alfalfa. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–2; woodland group 1; wildlife group 1.

Gale silt loam, shallow, 6 to 12 percent slopes, eroded (GlC2).—This soil is in nearly uniformly shaped areas on narrow ridgetops and knolls. This soil has a profile similar to the one described as representative for the series, but the subsoil has slightly less clay and more sand, and depth to sandstone bedrock is less. In many areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer. Some sandstone fragments are on the surface.

Included with this soil in mapping are a few small areas of Urne, Norden, and Eleva soils.

Available water capacity is low. The hazard of erosion is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is well suited to alfalfa and grasses. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–3; woodland group 5; wildlife group 3.

Gale silt loam, shallow, 12 to 20 percent slopes, eroded (GlD2).—This soil is in nearly uniformly shaped areas on a few narrow ridgetops, knolls, and side slopes. It has a profile similar to the one described as representative of the series, but the subsoil has more sand and less clay, and depth to sandstone is less. In many areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer. In some areas sandstone fragments are on the surface.

Included with this soil in mapping are a few areas of uneroded soils that are wooded. Also included are a few small areas of Urne, Norden, and Eleva soils.

Available water capacity is low, and the hazard of erosion is severe. In most areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to alfalfa and grasses for pasture. It is also well suited to pine tree plantations, but the shallow bedrock limits the use of equipment in a few places. Control of erosion and maintenance of tilth are good management practices. Capability unit VIe–3; woodland group 5; wildlife group 3.

Gale silt loam, shallow, 20 to 30 percent slopes, eroded (GlE2).—This soil is in nearly uniformly shaped areas on a few narrow ridgetops, knolls, and side slopes. It has a profile similar to the one described as representative of the series, but the surface layer is thinner, the subsoil has more sand and less clay, and depth to sandstone is less. Sandstone fragments occur on the surface.

Included with this soil in mapping are a few small areas of Urne and Eleva soils and small areas of soils that are more sloping than this Gale soil. Also included are some areas of uneroded soils.

Available water capacity is low, and the hazard of erosion is severe. In most areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

Most areas of this soil are in pasture or trees. This soil is better suited to use as woodland than to most other uses. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion and maintenance of tilth are good management practices. Capability unit VIIe–3; woodland group 5; wildlife group 3.

Gotham Series

The Gotham series consists of nearly level to moderately steep, somewhat excessively drained soils on stream and river terraces. These soils formed in sandy sediment. The native vegetation was bur and black oak savanna.

In a representative profile the plow layer is very dark grayish-brown loamy fine sand about 9 inches thick. The subsoil is dark-brown and brown loamy sand about 27 inches thick. It is underlain by light yellowish-brown medium sand that has dark-brown loamy bands 1/4 to 1 inch thick.

Permeability is rapid. Available water capacity and natural fertility are low. The subsoil is strongly acid. The hazard of soil blowing is severe.

Most of the nearly level to sloping areas of these soils are used for corn, oats, alfalfa, lima beans, and soybeans. Moderately steep areas are in pasture or woodland.

Representative profile of Gotham loamy fine sand, 2 to 6 percent slopes, 200 feet east of Pleasantville on the north side of County Highway E in the NW¼SE¼ sec. 24, T. 23 N., R. 8 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) loamy fine sand; weak, medium, subangular blocky structure; very friable; common roots; strongly acid; clear, smooth boundary.

B1—9 to 15 inches, dark-brown (10YR 4/3) loamy sand; weak, coarse, prismatic structure that parts to weak, medium, subangular blocky; very friable; common roots; strongly acid; clear, smooth boundary.

B2t—15 to 30 inches, brown (7.5YR 4/4) heavy loamy sand that has clay bridging between sand grains; weak, coarse, prismatic structure that parts to weak, medium, subangular blocky; very friable; common roots; strongly acid; gradual, smooth boundary.

B3—30 to 36 inches, brown (7.5YR 5/4) light loamy sand; weak, medium, subangular blocky structure; very friable; common roots; strongly acid; clear, smooth boundary.

C—36 to 60 inches, light yellowish-brown (10YR 6/4) medium sand that has dark-brown (7.5YR 4/4) bands of sandy loam and loamy sand 1/4 to 1 inch thick; single grained; loose; few roots; strongly acid.

The solum ranges from 20 to 38 inches in thickness. In most areas the loose, sandy substratum has a few bands that range from 1/4 inch to 4 inches in thickness.

The A horizon is dark brown (10YR 3/3) or very dark grayish brown (10YR 3/2) and ranges from 6 to 10 inches in thickness. The Bt horizon ranges from loamy fine sand to light fine sandy loam. In many places the clay bridging in the Bt horizon is so sparse that a hand lens is needed to detect it.

Gotham soils are on stream and river terraces adjacent to Sparta, Dickinson, and Billett soils. They have a thinner, lighter colored A horizon and have finer sand and slightly more clay than Sparta soils. They have a thinner A horizon and have less silt and clay than Dickinson soils. They have less silt and clay than Billett soils.

Gotham loamy fine sand, 0 to 2 percent slopes (GoA).—This soil is in irregularly shaped areas on stream and river terraces. The larger areas of this soil are in the southern part of the county near the Mississippi River. These areas have slightly more fine and very fine sand.

Included with this soil in mapping are small areas of Dickinson and Sparta soils. Also included are a few areas of sand and dark loamy sand underlain by loose sand that has loamy bands.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe. Irrigation is feasible in some of the larger areas of this soil.

This soil is suited to grasses and to a limited amount of row crops. If soil blowing is controlled and soil moisture and fertility are maintained, this soil is suited to soybeans, corn, and lima beans, and many areas are used for these crops. Capability unit IVs–3; woodland group 3; wildlife group 3.

Gotham loamy fine sand, 2 to 6 percent slopes (GoB).—This soil is in irregularly shaped areas on stream and river terraces. It has the profile described as representative for the series.

Included with this soil in mapping are areas, mainly on the terrace along the Mississippi River, that have more fine and very fine sand than this soil. Also included are a few areas of sand and dark loamy sand soils that are underlain by loose sand that has loamy bands.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe. Irrigation is feasible in some large areas of this soil, especially where slopes are 2 or 3 percent. Percolation of effluent from septic tanks is restricted where thick, loamy bands are in the loose sand.

This soil is suited to grasses and to a limited amount of row crops. The chief crops are soybeans, corn, and lima beans. If erosion is controlled, and soil moisture and fertility are maintained, this soil is suited to all row crops grown in the area. Capability unit IVs–3; woodland group 3; wildlife group 3.

Gotham loamy fine sand, 6 to 12 percent slopes (GoC).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is lighter colored.

Included with this soil in mapping are a few areas of sand and dark loamy sand that are underlain by loose sand that has loamy bands. Also included are a few

small areas of soils that are less sloping or more sloping than this Gotham soil.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe. Percolation of effluent from septic tanks is restricted in areas where thick, loamy bands are in the loose sand.

This soil is suited to grasses and to a limited amount of row crops. Control of erosion and maintenance of fertility are good management practices. Capability unit IVs–3; woodland group 3; wildlife group 3.

Gotham loamy fine sand, 12 to 20 percent slopes, eroded (GoD2).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is thinner and lighter colored.

Included with this soil in mapping are a few areas of sand and dark loamy sand underlain by loose sand that has loamy bands. Also included are a few small areas of soils that are less sloping or more sloping than this Gotham soil.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion. Percolation of effluent from septic tanks is restricted where thick, loamy bands are in the loose sand.

This soil is suited to grasses and to pine tree plantations. Control of erosion is a good management practice. Capability unit VIe–9; woodland group 3; wildlife group 3.

Gotham-Sparta loamy fine sands, 12 to 20 percent slopes (GpD).—The soils in this complex are on sand dunes on terraces of the Mississippi River. These dunes range from 4 to 60 acres in size and are generally oriented in a northwesterly-southeasterly direction. These soils are so intermingled and the areas are so small that it is impractical to map them separately. Gotham loamy fine sand makes up about 65 percent of the complex, and Sparta loamy fine sand makes up 35 percent. The native vegetation was bur oak savanna and dryland prairie grasses.

The Gotham soil has a profile similar to the one described as representative for the Gotham series, but the subsoil has less clay. The Sparta soil has a profile similar to the one described as representative for the Sparta series, but it has more fine and very fine sand.

Most areas of these soils are too steep and droughty to be cultivated. A few concave areas near depressions, however, are used for crops. The hazard of soil blowing is severe. Most of the dunes are stabilized and have a cover of grass, pine, and bur oak. These soils are suited to red and white pines. Capability unit VIe–9; woodland group 4; wildlife group 3.

Gullied Land

Gullied land (Gu) is in natural drainageways near the edge of steep slopes on stream terraces, valley bottoms, and uplands. These sloping to very steep areas are severely eroded, and in most places gullies have dissected areas several acres in size. The gullies are 5 to 85 feet wide, 3 to 45 feet deep, and 3 to 50 feet apart. The soil material is loamy fine sand, fine sandy loam, loam, silt loam, and silty clay loam that is strongly acid, and it is slightly calcareous in places. The color ranges from black to yellowish brown. Many areas of Gullied land are on valley slopes below areas of Stony and rocky land in Dodge Township.

Erecting gully control structures, fencing out livestock, and establishing a plant cover help to control gully erosion.

If the areas of Gullied land are properly managed, they are well suited to use as wildlife habitat and watershed management areas. Capability unit VIIIs–10; woodland group 13; wildlife group 1.

Hixton Series

The Hixton series consists of gently sloping to very steep, well-drained soils on ridges on uplands and on valley slopes. These soils formed in loamy sandstone residuum underlain by cemented sandstone bedrock. In many places this sandstone occurs as rock outcrop along valleys or on narrow ridges on uplands. The native vegetation was hardwoods, mainly red and black oaks.

In a representative profile the surface layer is dark-brown loam about 8 inches thick. The subsurface layer is brown loam 2 inches thick. The subsoil is about 24 inches thick. It is dark yellowish-brown and brown loam in the upper part and brown sandy loam in the lower part. Beneath the subsoil is brown sand residuum that is underlain at a depth of about 40 inches by brownish-yellow cemented sandstone.

Permeability is moderate. Available water capacity is moderate, and natural fertility is medium. The subsoil is mainly strongly acid to very strongly acid.

Most areas of moderately steep to very steep Hixton soils are used for pasture or as woodland. Most of the gently sloping to sloping areas are in corn, oats, and alfalfa.

Representative profile of Hixton loam, 2 to 6 percent slopes, eroded, in a pasture, 150 yards south of a town road in NW¼SW¼ sec. 30, T. 23 N., R. 7 W.:

Ap—0 to 8 inches, dark-brown (10YR 4/3) light loam; brown (10YR 5/3) when dry; moderate, coarse, subangular blocky structure; very friable; many roots; slightly acid; abrupt, smooth boundary.

A2—8 to 10 inches, brown (10YR 5/3) loam; weak, coarse and medium, subangular blocky structure that parts to weak, medium, platy; very friable; many roots; medium acid, clear, wavy boundary.

B1—10 to 19 inches, dark yellowish-brown (10YR 4/4) loam; moderate, coarse, subangular blocky structure; very friable; medium acid; clear, wavy boundary.

B2t—19 to 27 inches, brown (7.5YR 4/4) loam; moderate, coarse, subangular blocky structure; thin patchy clay films on ped faces; friable; strongly acid; clear, wavy boundary.

B3—27 to 34 inches; brown (7.5YR 4/4) sandy loam; weak, coarse and medium, subangular blocky structure; very friable; very strongly acid; abrupt, wavy boundary.

C1—34 to 40 inches, brown (7.5YR 4/4) fine and medium sand; loose; single grained; strongly acid.

R—40 to 60 inches, brownish-yellow (10YR 6/6) cemented, medium grained sandstone.

The solum ranges from 20 to 40 inches in thickness. Depth to sandstone bedrock is 24 to 40 inches.

The Ap horizon ranges from 6 to 10 inches in thickness. It is dark grayish brown (10YR 4/2), brown (10YR 4/3), or very dark grayish brown (10YR 3/2) and has a dry value of more than 5 and a dry chroma of more than 3. Where present, the A1 horizon is very dark brown (10YR 3/1) light loam or loam that ranges from 1 to 4 inches in thickness. The Bt horizon ranges from light loam to heavy loam.

Hixton soils are adjacent to Boone, Eleva, Gale, and La Farge soils. Hixton soils have more silt and clay than Boone and Eleva soils. They lack the moderately deep mantle of silt of La Farge and Gale soils. They are underlain by a more acid, coarser grained sandstone bedrock than La Farge soils.

Hixton loam, 2 to 6 percent slopes, eroded (HnB2).—This soil is in irregularly shaped areas on ridgetops and the sides of valleys. It has the profile described as representative for the series.

Included with this soil in mapping are a few areas of moderately well drained and somewhat poorly drained loamy soils that are underlain by sandstone. Also included are a few small areas of Eleva soils and a few areas of soils that have a darker colored surface layer than this Hixton soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is slight, but the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to corn, oats, and alfalfa. It is generally used for corn. Control of erosion is a good management practice. Capability unit IIe–2; woodland group 1; wildlife group 1.

Hixton loam, 6 to 12 percent slopes, eroded (HnC2).—This soil is in irregularly shaped areas on ridgetops and the sides of valleys. In many areas where this soil has been cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of soils that have a darker surface layer than this Hixton soil and a few areas of Eleva soils. Also included are a few areas of sandy loams and loams that are underlain by moderately deep to deep silt, and a few small areas of soils that are less sloping or more sloping than this Hixton soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is moderate. In many areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion is a good management practice. Capability unit IIIe–2; woodland group 1; wildlife group 1.

Hixton loam, 12 to 20 percent slopes, eroded (HnD2).—This soil is in irregularly shaped areas on the sides of ridges and valleys. It has a profile similar to the one described as representative of the series, but the surface layer is thinner and lighter in color, and depth to sandstone is less.

Included with this soil in mapping are a few areas of sandy loams and loams that are underlain by moderately deep to deep silty loess, a few small areas of Gale and Eleva soils, and a few areas of loams that formed in sandy loam till underlain by sandstone residuum. Also included are a few areas of uneroded soils, mainly in woodland, that have a darker surface layer than this soil, and small areas of soils that are less sloping or more sloping than this Hixton soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is severe. In many areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to alfalfa and grasses. Some areas are in pasture and woodland. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–2; woodland group 1; wildlife group 1.

Hixton loam, 20 to 30 percent slopes, eroded (HnE2).—This soil is in irregularly shaped areas on the sides of ridges and valleys. It has a profile similar to the one described as representative of the series, but the surface layer is thinner and depth to sandstone is less.

Included with this soil in mapping are a few small areas of Gale and Eleva soils. Also included are some areas of uneroded soils, mainly in woodland, that have a darker colored surface layer than this soil and small areas of soils that are less sloping or more sloping than this Hixton soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is severe. In most cleared areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to grasses and alfalfa for pasture. It is well suited to woodland. Control of erosion and maintenance of tilth are good management practices. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIe–2; woodland group 1; wildlife group 1.

Hixton loam, 30 to 45 percent slopes (HnF).—This soil is in irregularly shaped areas on sides of ridges and valleys. It has a profile similar to the one described as representative for the series, but the surface layer is very dark gray and is 1 to 4 inches thick. Also, a few areas of this soil have convex slope breaks that are lighter in color, and the subsoil has less clay and more sand.

Included with this soil in mapping are a few areas of sandy loams that are underlain by moderately deep to deep silty loess and a few small areas of Gale and Eleva soils. Also included are a few areas of eroded soils and a few small areas of soils that are less sloping than this Hixton soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is severe.

Most areas of this soil are woodland. This soil is especially well suited to hardwoods of medium quality, such as red, white, and black oaks, and to conifers of good quality, such as red and white pines. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIIe–2; woodland group 1; wildlife group 1.

Houghton Series

The Houghton series consists of very poorly drained soils on bottom lands and flood plains along streams and rivers. These soils formed in deposits of organic matter that are more than 50 inches thick. The native vegetation was wetland grasses, sedges, rushes, and tall shrubs. In some areas, mainly in the Tamarack Valley, the native vegetation was tamarack trees and a ground cover of moss.

In a representative profile the soil is very dark brown to black muck about 60 inches thick. This is underlain by gray loamy sand.

Permeability is moderately rapid, but percolation of

water is slow where the water table is high. Available water capacity is very high. Natural fertility is medium to moderately low.

Most areas of these soils are used for wetland pasture, as wildlife habitat, and for water storage basins. Where adequately drained, these soils are suited to corn.

Representative profile of Houghton muck, in a sedge meadow along the Black River, in the NE¼NE¼ sec. 9, T. 18 N., R. 8 W.:

Oa1—0 to 8 inches, very dark brown (10YR 2/2) sapric material that has many, coarse and medium, very dark brown (10YR 2/2) herbaceous fibers; 25 percent fiber content, 10 percent when rubbed; weak, fine, granular structure; neutral; abrupt, smooth boundary.

Oa2—8 to 14 inches, black (10YR 2/1) sapric material that has many, fine and medium, grayish-brown (10YR 5/2) herbaceous fibers; 45 percent fiber content, 10 percent when rubbed; fine, granular structure; neutral; abrupt, smooth boundary.

Oa3—14 to 28 inches, very dark brown (10YR 2/2) sapric material that has many, coarse to fine, dark-brown (7.5YR 3/2) and brown (7.5YR 4/4) herbaceous fibers; 50 percent fiber content, less than 10 percent when rubbed; massive breaking to weak, fine, granular structures; abrupt, smooth boundary.

Oa4—28 to 31 inches, very dark gray (10YR 3/1) sapric material that has many, coarse to fine, dark grayish-brown (10YR 4/2) herbaceous fibers; 80 percent fiber content, about 10 percent when rubbed; massive; neutral; clear, smooth boundary.

Oa5—31 to 35 inches, black (10YR 2/1) sapric material that has common, medium and fine, brown (10YR 5/3) herbaceous fibers; 17 percent fiber content, 5 percent when rubbed; massive; neutral; clear, smooth boundary.

Oa6—35 to 39 inches, black (10YR 2/1) sapric material that has many, coarse to fine, grayish-brown (10YR 5/2) and brown (10YR 5/3) herbaceous fibers; 30 percent fiber content, 10 percent when rubbed; coarse and medium sand in a band about 1 inch thick; massive; neutral; abrupt, wavy boundary.

Oa7—39 to 60 inches, black (10YR 2/1) sapric material that has common, very coarse, dark yellowish-brown (10YR 4/4) herbaceous fibers; 15 percent fiber content, 5 percent when rubbed; coarse and medium sand and a few fragments of charcoal; massive; neutral; gradual, smooth boundary.

IICg—60 to 70 inches, gray (10YR 5/1) loamy sand; single grained; loose; neutral.

The Oa1 horizon is granular sapric material that ranges from 4 to 12 inches in thickness and is black (N 2/0 to 10YR 2/1), very dark gray (7.5YR to 10YR 3/1), or very dark brown (7.5YR to 10YR 2/2). It commonly is neutral or slightly acid in reaction, but it is slightly alkaline in limed areas. The Oa3, Oa4, and Oa5 layers are sapric material that is black (N 2/0 to 10YR 2/1), dark gray (7.5YR to 10YR 3/1), or very dark brown (7.5YR to 10YR 2/2). In a few areas these layers have thin bands of very dark brown (7.5YR to 10YR 2/2), dark grayish-brown (10YR 4/2), dark yellowish-brown (10YR 4/4), or dark-brown (7.5YR 4/4) hemic and fibric material. Where the water table is lowered somewhat, the upper part of the Oa3, Oa4, and Oa5 layers have granular or platy structure or prismatic structure that parts to medium and coarse, blocky. The Oa6 and Oa7 layers are massive sapric material that has a few thin bands of sand, silt, and hemic or fibric material. The thickness of the deposits of organic matter ranges from 52 to 84 inches.

Houghton soils are adjacent to poorly drained Palms, Wallkill, and Ettrick soils. They formed in thicker deposits of organic matter than Palms soils. They lack the silty alluvium underlain by deposits of organic matter that is typical of Wallkill soils. Houghton soils formed in deposits of organic matter, but Ettrick soils formed in silty alluvium.

Houghton muck (Ho).—This soil is nearly level and is in uniformly shaped areas on bottom lands and flood plains.

Included with this soil in mapping are a few small areas of a soil that has slopes of more than 2 percent.

The hazard of erosion along streams and the hazard of soil blowing in cultivated areas are moderate to severe. Subsidence of cultivated areas is also a hazard. The hazard of flooding is severe in some areas. The water table is near the surface in most areas, but in a few areas it has been lowered by stream entrenchment or other natural conditions.

Most areas of this soil are used for wetland pasture, as wildlife habitat, and for water storage basins. If this soil is drained, it is suited to corn. Control of erosion along streambanks or in cultivated areas and maintenance of fertility are good management practices. Capability unit IIIw–9; woodland group 10; wildlife group 6.

Huntsville Series

The Huntsville series consists of well drained and moderately well drained soils in drainageways of draws on uplands and on narrow valley bottoms. Most areas of these soils are near the base of steeper areas. The soils formed in recent, weakly stratified, silty alluvium. The native vegetation was moist-land prairie grasses, tall shrubs, and a few trees such as silver maple, elm, and hickory.

In a representative profile the surface layer is about 38 inches thick. It is very dark grayish-brown silt loam in the upper part and very dark brown silt loam in the lower part. It is underlain by dark-brown silt loam that has brown mottles.

Available water capacity is very high. Natural fertility is high. Permeability is moderate. During wet seasons these soils receive deposits of silt and fine sand sediment through runoff from adjacent uplands, and they are flooded for short periods. The alluvium is unstable where it is saturated with water, and gullies formed where runoff water concentrates. The hazard of streambank erosion is severe on areas along streams.

Most areas of these soils are cultivated, and corn is the chief crop.

Representative profile of Huntsville silt loam, 0 to 3 percent slopes, in a pasture next to a stream north of County Highway VV in NW¼SW¼ sec. 24, T. 23 N., R. 9 W.:

A11—0 to 6 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, subangular blocky structure that parts to weak, fine, granular; very friable; common roots; neutral, abrupt, smooth boundary.

A12—6 to 28 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, platy structure that parts to weak, fine, granular; very friable; few roots; neutral; clear, smooth boundary.

A13—28 to 38 inches, very dark brown (10YR 2/2) silt loam that has faint silica coatings; weak, medium, platy structure that parts to weak, fine, subangular blocky; very friable; medium acid; abrupt, wavy boundary.

C—38 to 60 inches, dark-brown (10YR 3/3) silt loam coated with lighter colored silt particles; common, fine, faint, brown (7.5YR 4/4) mottles; moderate, fine, subangular blocky structure that parts to fine, granular; very friable; medium acid.

The solum ranges from 32 to 42 inches in thickness. The Ap horizon commonly is slightly acid or medium acid,

but in places it is neutral in reaction, especially in limed areas. The A horizon is very dark grayish brown (10YR 3/2) to dark brown (10YR 3/3) in the upper part. The lower part commonly is an old, buried surface layer that is black (10YR 2/1) or very dark brown (10YR 2/2). In some areas, the upper part of the A horizon has thin, weak strata, mostly of silt loam and a few bands of fine sandy loam and very fine sand. In some places the C horizon has layers of very fine sand.

Huntsville soils are adjacent to Lawson, Worthen, Ettrick, Houghton, and Palm soils. Huntsville soils are better drained than Lawson soils, and they lack a B horizon. They are more stratified than Worthen soils. Huntsville soils have a thicker A horizon and are better drained than Ettrick soils. Huntsville soils formed in silty alluvium, but Houghton and Palms soils formed in organic material.

Huntsville silt loam, 0 to 3 percent slopes (HuA).—This soil is in uniformly shaped areas in drainageways of draws on uplands and on valley bottoms.

Included with this soil in mapping are a few areas of soils that have a lighter colored surface layer than this soil and a few small areas of Lawson, Ettrick, and Port Byron soils. Also included are a few small areas of soils that have slopes of slightly more than 3 percent.

During wet seasons most areas of this soil are subject to flooding for short periods by runoff and stream overflow. The hazard of streambank erosion is severe in areas along streams. The hazard of erosion is slight in sloping areas. The alluvium is unstable where it is wet, and a few gullies form in sloping areas that are cultivated intensively.

This soil is suited to corn. Control of erosion and protection from flooding during wet seasons are good management practices. Capability unit IIw–11; woodland group 12; wildlife group 7.

Kato Series

The Kato series consists of nearly level to gently sloping, poorly drained soils. These soils are in drainageways and depressions on stream and river terraces and narrow valley bottoms. They formed in silty alluvium underlain by loose sand. The native vegetation was wetland prairie grasses, tall shrubs, and a few trees, such as elm and silver maple.

In a representative profile the plow layer is very dark grayish-brown silt loam about 10 inches thick. The subsoil is about 24 inches thick. The upper part is light brownish-gray, platy silt loam that has many yellowish-brown mottles, and the lower part is light brownish-gray fine sandy loam that has brownish-yellow mottles. It is underlain by loose, very pale brown sand that has yellow mottles.

Permeability is moderate, but percolation of water is slow where the water table is high. Available water capacity and natural fertility are high. In some areas the level of the water table has been lowered by stream entrenchment or other natural causes. Wet areas can be drained by open ditches if a natural outlet exists.

Most areas of Kato soils are suited to corn where drainage is adequate. Wet areas are used for pasture and wildlife habitat.

Representative profile of Kato silt loam, 0 to 3 percent slopes, in field of alfalfa, 100 yards north of Wisconsin Highway 27 in NW¼NW¼ sec. 23, T. 24 N., R. 7 W.:

Ap—0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, subangular blocky structure; very friable; many roots; medium acid; abrupt, smooth boundary.

B2g—10 to 28 inches, light brownish-gray (10YR 6/2) silt loam that has many, medium, prominent, yellowish-brown (10YR 5/6) mottles; moderate, coarse, prismatic structure that parts to medium and coarse, platy; very friable; many roots; strongly acid; gradual, smooth boundary.

B3g—28 to 34 inches, light brownish-gray (10YR 6/2) fine sandy loam that has many, medium, prominent, brownish-yellow (10YR 6/6) mottles; moderate, coarse, prismatic structure that parts to moderate, coarse, platy; very friable; few roots; strongly acid; gradual, smooth boundary.

C—34 to 60 inches, very pale brown (10YR 7/3) sand that has many, coarse, prominent, yellow (10YR 7/6) mottles; loose; single grained; strongly acid.

The alluvium and the solum are the same thickness, 24 to 40 inches.

The Ap horizon ranges from very dark grayish brown (10YR 3/2) to very dark brown (10YR 2/2) and from neutral to medium acid. The A horizon ranges from 10 to 14 inches in thickness. Most of the Bg horizon has a hue of 10YR, a value of 4, 5, or 6, and a chroma of 2 or less.

Kato soils are adjacent to Meridian, Ettrick, and Palms soils. They are more poorly drained and have more silt and less clay than Meridian soils. Kato soils formed in thinner alluvium than Ettrick soils, and their subsoil has more silt and less clay than that of those soils. Kato soils formed in silty alluvium, but Palms soils typically formed in deposits of organic material.

Kato silt loam, 0 to 3 percent slopes (KcA).—This soil is in uniformly shaped areas in depressions and drainageways on stream and river terraces and on narrow valley bottoms.

Included with this soil in mapping are a few areas of soils that have a lighter colored surface layer than this soil and a few areas of soils that have loamy bands in the sandy substratum. Also included are a few small areas of Ettrick and Palms soils.

This soil has a seasonal high water table. In some areas the water table has been lowered by stream entrenchment. In areas that are subject to flooding by runoff, shallow surface drains or water-diversion structures are needed to permit tillage. If areas of this soil along valley streams are cultivated or heavily pastured, the hazard of streambank erosion is severe.

This soil is suited to corn where drainage is adequate. Wet areas are used for pasture and wildlife habitat. Protection from stream overflow and control of erosion are good management practices. Capability unit IIw–5; woodland group 9; wildlife group 5b.

Kato Series, Sandy Loam Variant

The Kato series, sandy loam variant, consists of poorly drained soils in nearly level drainageways and depressions on stream and river terraces. Most areas of these soils are in the northeastern part of the county, where many of the drainageways are partly filled or blocked by silt and muck deposits. They formed in coarse, loamy sediment underlain by loose sand. The native vegetation was wetland prairie grasses, tall shrubs, and a few trees, such as elm and silver maple.

In a representative profile the plow layer is very dark grayish-brown loam 11 inches thick. The subsoil, about 19 inches thick, is grayish-brown and light brownish-gray sandy loam that has yellowish-red

mottles. It is underlain by loose brownish-yellow and pale-brown sand.

Permeability is moderate, but percolation of water is slow where the water table is high. Available water capacity is moderate, and natural fertility is medium. The subsoil is generally strongly acid. Drainage of wet areas is difficult where natural drainage outlets are filled or partly blocked by silt and muck deposits. Wet areas can be drained by open ditches if natural outlets are available.

Areas of these soils in the southern part of Trempealeau County are suited to row crops, such as corn. Most areas in the northern part of the county are wet and are in narrow drainageways. These areas are suited to grasses for pasture and to wildlife habitat.

Representative profile of Kato loam, sandy loam variant, in a pasture, 250 yards from the east boundary of Trempealeau County in NE¼SE¼ sec. 36, T. 24 N., R. 7 W.:

Ap—0 to 11 inches, very dark grayish-brown (10YR 3/2) loam; moderate, medium, subangular structure that parts to moderate, medium and fine, granular; very friable; medium acid; abrupt, smooth boundary.

B21g—11 to 18 inches, grayish-brown (10YR 5/2) heavy sandy loam that has many, coarse, prominent, yellowish-red (5YR 4/6 to 4/8) mottles; weak, coarse, prismatic structure that parts to moderate, coarse, subangular blocky; very friable; medium acid; gradual, smooth boundary.

B22g—18 to 30 inches, light brownish-gray (10YR 6/2) heavy sandy loam that has many, medium, prominent, yellowish-red (5YR 4/6 to 4/8) mottles; weak, coarse, prismatic structure that parts to moderate, coarse, subangular blocky; very friable; strongly acid; abrupt, smooth boundary.

C1—30 to 37 inches, brownish-yellow (10YR 6/6) medium sand; loose; single grained; very strongly acid; abrupt, smooth boundary.

C2—37 to 60 inches, pale-brown (10YR 6/3) medium sand; loose; single grained; very strongly acid.

The solum ranges from 24 to 36 inches in thickness. It is underlain by loose sand that has bands of sandy loam, loam, or silt loam in a few areas.

The Ap horizon is very dark brown (10YR 2/2) or very dark grayish-brown (10YR 3/2) loam that ranges from 10 to 14 inches in thickness. It commonly is slightly acid or medium acid, but it is neutral in some limed fields. The Bg horizon mainly has hues of 10YR and 2.5Y, a value of 4, 5, or 6, and a chroma of 2. Most of the Bg horizon is sandy loam, but in some areas it has thin bands of loam.

Kato soils, sandy loam variant, are adjacent to Wet alluvial land; Ettrick soils, clayey subsoil variant; and Meridian and Shiffer soils. They are more poorly drained than Meridian and Shiffer soils, and they have a B horizon that is more sandy and less clayey. They formed in coarse loamy sediment, but Ettrick soils, clayey subsoil variant, formed in silty clay alluvium. They have a B horizon that lacks the stratified soil material that is typical of Wet alluvial land.

Kato loam, sandy loam variant (Ka).—This nearly level soil is in irregularly shaped areas in drainageways and depressions on stream and river terraces.

Included with this soil in mapping, mainly in the northern part of the county, are small, narrow areas of wet soils that have a mucky surface layer. Also included are a few areas of soils that have slopes of slightly more than 2 percent.

Permeability is moderate, but percolation of water is slow. The water table is seasonally high. In the southern part of the county, the depth to the water table has been lowered by stream entrenchment or other natural conditions.

Where drainage is adequate, this soil is suited to corn. In other areas, especially in the northern part of the county, this soil is subject to frequent flooding caused by runoff. Drainage is difficult because natural drainageways are filled or partly blocked by silt and peat deposits. Most of these areas are in native marsh grasses that provide wildlife habitat and help control erosion. Capability unit IIw–5; woodland group 7; wildlife group 5b.

La Farge Series

The La Farge series consists of gently sloping to steep, well-drained soils on uplands. Most areas of these soils are sloping and moderately steep and occur on ridgetops. These soils formed in silty loess and loamy sandstone residuum that is underlain by soft, shaly sandstone (fig. 13). Generally, the shaly sandstone is at an intermediate elevation between valley bottoms and high limestone ridges. The native vegetation was hardwoods, mainly red and black oaks.

In a representative profile the surface layer is very dark grayish-brown silt loam 2 inches thick. The subsurface layer is dark grayish-brown silt loam 7 inches thick. The subsoil is about 25 inches thick. It is dark-brown silt loam and silty clay loam in the upper part and yellowish-brown loam in the lower part. Beneath

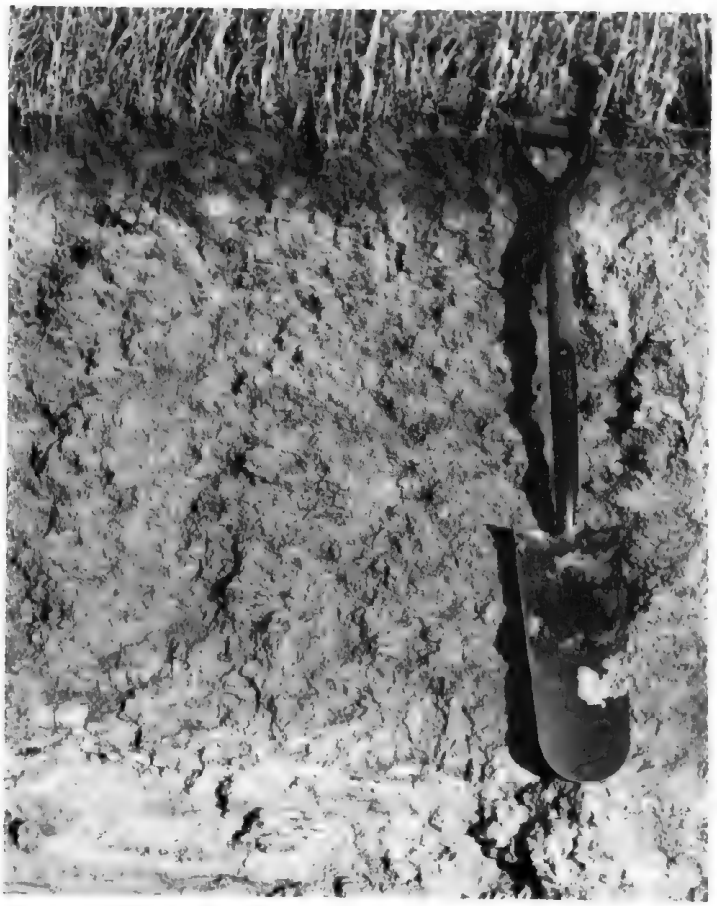

Figure 13.—**Profile of a La Farge silt loam, showing soft sandstone.**

the subsoil is light olive-brown sandy loam and loamy sand that has bands of dark grayish-brown loam. The underlying material is soft, shaly, olive-brown sandstone.

Permeability is moderate. Available water capacity is moderate, and natural fertility is medium. Potassium is available for plant growth where glauconite decomposes in the subsoil and substratum. Residuum in the subsoil and substratum is unstable when wet.

Most gently sloping to moderately steep areas of these soils are in corn, oats, and alfalfa. Steep and very steep areas are in pasture or woodland.

Representative profile of La Farge silt loam in an area of La Farge silt loam, 6 to 12 percent slopes, eroded, in a wooded area on a narrow ridgetop along County Highway W in the NE¼SW¼ sec. 13, T. 22 N., R. 7 W.:

O1—1/2 inch, hardwood leaf litter.
A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; neutral; clear, wavy boundary.
A2—2 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy structure that parts to very weak, fine, subangular blocky; very friable; slightly acid; clear, wavy boundary.
B1—9 to 15 inches, dark-brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.
B2t—15 to 29 inches, dark-brown (10YR 4/3) silty clay loam; moderate, coarse, subangular blocky structure that parts to fine, subangular blocky; firm; many, continuous to nearly continuous, dark-brown clay films on ped faces; bleached silt coatings on ped faces along dominant cleavage planes; strongly acid; clear, smooth boundary.
IIB3—29 to 34 inches, yellowish-brown (10YR 5/4) loam; moderate, coarse, subangular blocky structure that parts to moderate and weak, fine, subangular blocky; friable; strongly acid; clear, smooth boundary.
IIC—34 to 36 inches, light olive-brown (2.5Y 5/4) sandy loam and loamy sand; thin layers of dark grayish-brown (2.5Y 4/2) loam; massive; residuum has grains of green glauconite; slightly acid; clear, smooth boundary.
IIR—36 to 60 inches, olive-brown (2.5Y 4/4) soft, fine-grained, sandstone bedrock that has many thin layers of olive-gray (5Y 4/2) glauconite; slightly acid.

The silty loess mantle ranges from 18 to 35 inches in thickness. The solum ranges from 20 to 40 inches in thickness. Glauconite content of the residuum varies. In areas that have small amounts of glauconite, the residuum is more sandy and more siliceous than in others.

Where present, the Ap horizon ranges from dark brown (10YR 3/3) to dark grayish brown (10YR 4/2). It has a dry value of more than 5 and a dry chroma of more than 3. The Ap horizon commonly is medium acid or slightly acid, but it is neutral in some limed areas. The A1 horizon is very dark brown (10YR 2/2) or very dark grayish brown (10YR 3/2) and ranges from 2 to 6 inches in thickness. It is neutral or slightly acid in reaction.

La Farge soils are adjacent to Hixton, Eleva, Gale, and Fayette soils. They are underlain by a less acid, finer grained sandstone than the Hixton, Eleva, and Gale soils. They formed in moderately deep deposits of silt, and Fayette soils typically formed in deep deposits of silt.

La Farge silt loam, 2 to 6 percent slopes, eroded (LfB2).—This soil is in irregularly shaped areas on ridgetops. A few large areas are on low upland benches near the Buffalo River. This soil has a profile similar to the one described as representative for the series, but the surface layer is thicker and lighter in color. In areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few small areas of Norden, Gale, and Fayette soils. Also included are a few areas of soils that have a dark-colored surface layer and small areas of soils that are less sloping or more sloping than this La Farge soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is slight, but in most areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is well suited to corn, oats, and alfalfa. It commonly is used for corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIe–2; woodland group 1; wildlife group 1.

La Farge silt loam, 6 to 12 percent slopes, eroded (LfC2).—This soil is in irregularly shaped areas on ridgetops. It has a profile similar to the one described as representative for the series, but in areas where this soil is cultivated, the surface layer is lighter in color.

Included with this soil in mapping are a few areas of severely eroded soils and a few small areas of Norden, Gale, and Fayette soils. Also included are small areas of soils that are less sloping or more sloping than this La Farge soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is moderate. In most areas of this soil, the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and limited amounts of corn. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IIIe–2; woodland group 1; wildlife group 1.

La Farge silt loam, 12 to 20 percent slopes, eroded (LfD2).—This soil is in irregularly shaped areas on the sides of ridges. In areas where this soil is cultivated, some material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping, in wooded areas, are soils that have a profile similar to the one described as representative for the series. Also included are a few areas of severely eroded soils; a few small areas of Norden, Gale, and Fayette soils; and small areas of soils that are less sloping or more sloping than this La Farge soil.

The hazard of erosion is severe. Available water capacity is moderate, and natural fertility is medium. In most areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

Most areas of this soil are in crops or pasture. This soil is well suited to alfalfa and grasses. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–2; woodland group 1; wildlife group 1.

La Farge silt loam, 20 to 35 percent slopes (LfE).—This soil is in irregularly shaped areas on the sides of ridges. It has a profile similar to the one described as representative of the series, but the subsoil is thinner.

Included with this soil in mapping are a few areas of eroded soils and a few areas of Fayette and Port Byron soils. Also included are a few small areas of

Gale, Norden, and Urne soils and small areas of soils that are less sloping or more sloping than this La Farge soil.

The hazard of erosion is severe. Available water capacity is moderate, and natural fertility is medium.

Most areas of this soil are in pasture or woodland. The less sloping areas are suited to grasses and alfalfa for pasture. This soil is also well suited to hardwoods, such as red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion is a good management practice. Capability unit VIe–2; woodland group 1; wildlife group 1.

La Farge silt loam, 20 to 30 percent slopes, eroded (LfE2).—This soil is in irregularly shaped areas on the sides of ridges. It has a profile similar to the one described as representative for the series. but the surface layer is lighter in color and the subsoil is thinner.

Included with this soil in mapping are a few areas of severely eroded soils and a few small areas of Gale, Norden, and Urne soils. Also included are small areas of soils that are less sloping or more sloping than this La Farge soil.

The hazard of erosion is severe. Available water capacity is moderate, and natural fertility is medium. The sandstone residuum is unstable when wet and gullies commonly form if the surface layer is disturbed.

Nearly all areas of this soil are in pasture or hayland. This soil is suited to grasses and alfalfa for pasture. It is also well suited to hardwoods, such as red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit VIe–2; woodland group 1; wildlife group 1.

Lawson Series

The Lawson series consists of nearly level to gently sloping, somewhat poorly drained soils that are along flood plains and in drainageways of valley bottoms and stream terraces. Most areas of these soils are near the base of steeper areas. The soils formed in recent, weakly stratified alluvium. The native vegetation was moist-land prairie grasses, tall shrubs, and a few trees, such as silver maple and elm.

In a representative profile the surface layer is very dark brown silt loam about 30 inches thick. It is underlain by grayish-brown silt loam that has brown mottles.

Natural fertility is high, and available water capacity is very high. Permeability is moderate, but percolation of water is slow during wet seasons. The water table is seasonally high for short periods where water is concentrated by runoff and stream overflow. Runoff from adjacent uplands and stream overflow flood these soils and deposit silty and sandy sediment in some areas. This sediment is unstable in wet areas. Wetness from stream overflow delays tillage. Gullies form where runoff concentrates.

Most areas of these soils are suited to corn if streambank erosion and stream overflow are controlled.

Representative profile of Lawson silt loam, 0 to 3 percent slopes, in a field of alfalfa, 200 feet west of a small creek along County Highway DD in SE¼NW¼ sec. 8, T. 19 N., R. 7 W.:

Ap—0 to 10 inches, very dark brown (10YR 2/2) silt loam; weak, coarse, subangular blocky structure that parts to weak, medium, platy; very friable; neutral; abrupt, smooth boundary.

A12—10 to 30 inches, very dark brown (10YR 2/2) silt loam that has fine, distinct, brown (7.5YR 5/4) mottles in the lower 4 inches; weak, medium, subangular blocky structure that parts to weak, medium, platy; very friable; neutral; gradual, wavy boundary.

Cg—30 to 60 inches, grayish-brown (10YR 5/2) silt loam that has common, medium, distinct, brown (7.5YR 5/4) mottles; massive structure that parts to weak, coarse, platy; very friable; neutral.

The solum ranges from 24 to 48 inches in thickness and is slightly acid to mildly alkaline.

The upper part of the A horizon ranges from very dark brown (10YR 2/2) to dark brown (10YR 3/3). The lower part is black (10YR 2/1) and is an old buried surface layer. The A horizon ranges from 24 to 48 inches in thickness. It is silt loam but has thin bands of fine sandy loam and very fine sand in some areas. High-chroma mottles are in the lower part of the A horizon in most places.

The Lawson soils in Trempealeau County have higher chroma mottles in the C horizon than is typical for the Lawson series.

Lawson soils are adjacent to areas of Loamy alluvial land and to Huntsville and Wallkill soils. They have a thicker A horizon than Loamy alluvial land, and they do not have the extreme stratification and extreme variation of texture that are typical of Loamy alluvial land. They are more poorly drained than Huntsville soils. They do not have the deposits of organic matter in the C horizon that Wallkill soils typically have.

Lawson silt loam, 0 to 3 percent slopes (LsA).—This soil is in uniformly shaped areas along flood plains and in drainageways of valley bottoms and stream terraces.

Included with this soil in mapping are a few areas of soils that have a lighter colored surface layer than this soil. Also included are a few small areas of Wallkill and Ettrick soils and of Loamy alluvial land.

Runoff and stream overflow on this soil cause flooding during wet seasons. The hazard of streambank erosion is severe in cultivated and pastured areas.

This soil is well suited to corn if streambank erosion and stream overflow are controlled. Capability unit IIW–13; woodland group 9; wildlife group 7.

Loamy Alluvial Land

Loamy alluvial land (Lv) is in nearly level, uniformly shaped areas on the bottom lands of rivers and streams throughout the county. It consists of light-colored and dark-colored, stratified sediment deposited by floodwater. It varies in texture and drainage, but it is mainly moderately well drained and somewhat poorly drained loam and silt loam that are slightly acid to mildly alkaline. This sediment is underlain at a depth of 3 to 10 feet by loose sand.

Included with this land type in mapping are small areas of poorly drained Kato, Ettrick, Houghton, and Palms soils and a few small areas of gently sloping soils. Also included are small ponds and areas of Marsh.

Permeability is moderate to moderately rapid, but percolation of water in wet seasons is slow where the water table is high. Depth to the seasonally high water table is 1 to 5 feet. Runoff is slow.

Much of this land type is in pasture, trees, or brush. Loamy alluvial land is well suited to pasture, woodland, and wildlife habitat. Flooding is common, but some crops are grown where the danger of flooding is less. Row crops can be grown if fertility and soil structure are maintained and if this soil is protected from flooding. Tillage is delayed during wet seasons. Susceptibility to flooding and erosion of streambanks are major concerns. Capability unit IIw–13; woodland group 1; wildlife group 7.

Loamy Terrace Escarpments

Loamy terrace escarpments (Lx) consists of moderately steep to very steep, long, narrow fronts of terraces near rivers and streams (fig. 14). The native vegetation was white pine and hardwoods in some areas and prairie grasses and a few trees in other areas.

Loamy terrace escarpments formed where rivers and streams cut through loamy and silty soils that have been altered by erosion and decomposition. In most areas Loamy terrace escarpments are underlain at a depth of 20 to 50 inches by loose sand. In a few areas they are underlain by sandstone bedrock or deep silty loess.

Included with this land type in mapping are small areas of Downs, Fayette, Whitehall, Trempealeau, and Meridian soils.

The hazard of erosion, especially gully erosion, is very severe. Gully erosion is more common where areas of Loamy terrace escarpments are heavily pastured or where they have been disturbed.

Most areas are in pasture and trees. This land type is suited to grasses, alfalfa, and trees. Control of erosion is the major need. Capability unit VIIe–1; woodland group 1; wildlife group 1.

Marsh

Marsh (Ma) is nearly level and is on flood plains of rivers and streams, mainly along Beaver Creek and the Trempealeau, Black, and Mississippi Rivers. This land type consists of shallow ponds underlain by loamy and organic sediment.

Included with this land type in mapping are small areas of moderately well drained and somewhat poorly drained Sparta soils that have a mottled subsoil, some-

Figure 14.—An area of Loamy terrace escarpments along the Trempealeau River south of Independence.

what poorly drained Morocco soils, poorly drained Houghton and Palms soils, and areas of Loamy alluvial land and Sandy alluvial land.

Most areas of Marsh are subject to stream and river overflow in wet seasons. Runoff is slow.

Most marsh areas are in rushes, sedges, cattails, and other marsh plants. These areas are suited to wildlife habitat and to water storage areas. Capability unit VIIIw–15; woodland group 10; wildlife group 5b.

Meridian Series

The Meridian series consists of nearly level to sloping, well-drained soils on stream and river terraces. The soils formed in loamy sediment underlain by loose sand. The native vegetation was oak savanna.

In a representative profile the plow layer is very dark grayish-brown loam about 9 inches thick. The subsoil is about 21 inches thick. It is dark-brown loam in the upper part, dark yellowish-brown heavy loam in the middle part, and dark yellowish-brown sandy loam in the lower part. It is underlain by dark yellowish-brown and brownish-yellow loose sand.

Permeability is moderate in the loamy upper part and rapid in the sandy lower part of these soils. Available water capacity is moderate, and natural fertility is medium.

Meridian soils are suited to corn, oats, and alfalfa. Corn is the chief crop.

Representative profile of Meridian loam, 0 to 2 percent slopes, in a cornfield, 50 feet south of County Highway H and 300 yards west of the junction of County Highway H and U.S. Highway 53 in SE¼NE¼ sec. 21, T. 24 N., R. 7 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) light loam; weak, medium and very fine, subangular blocky structure; few, dark-brown (10YR 4/3) worm casts; very friable; many roots; neutral; abrupt, wavy boundary.

B1—9 to 12 inches, dark-brown (10YR 4/3) loam; weak, coarse, subangular structure that parts to weak, medium, platy; many, very dark grayish-brown (10YR 3/2) worm casts; very friable; many roots; neutral; clear, smooth boundary.

B21t—12 to 18 inches, dark-brown (10YR 4/3) heavy loam; moderate, coarse and medium, subangular blocky structure; few, thin, patchy clay films on ped faces, and clay bridging of sand grains; very friable; few roots; neutral.

B22t—18 to 26 inches, dark yellowish-brown (10YR 4/4) heavy loam; moderate, coarse and medium, subangular blocky structure; few, thin, patchy clay films on ped faces, and clay bridging of sand grains; friable; very strongly acid; clear, wavy boundary.

B3—26 to 30 inches, dark yellowish-brown (10YR 4/4) sandy loam; weak, coarse, subangular blocky structure that parts to moderate, medium and fine, subangular blocky; very friable; strongly acid; gradual, smooth boundary.

C1—30 to 36 inches, yellowish-brown (10YR 5/6) medium sand; single grained; loose; strongly acid; few dark yellowish-brown bands about 1 inch thick; gradual, smooth boundary.

C2—36 to 60 inches, brownish-yellow (10YR 6/6) medium sand; single grained; loose, strongly acid.

The solum ranges from 24 to 36 inches in thickness.

The Ap horizon is light loam or loam that ranges from dark brown (10YR 3/3) or very dark grayish brown (10YR 3/2) to black (10YR 2/1) in color. It commonly is medium acid or slightly acid, but in limed areas it is neutral in reaction. In most cultivated areas, all or most of the material from the A2 horizon is mixed with that in the Ap horizon. The Bt horizon ranges from light loam to heavy loam.

Meridian soils are adjacent to Eleva, Pillot, and Billett soils. They have slightly more silt and clay than Eleva soils and are underlain by loose sand rather than sandstone. Meridian soils lack the moderately deep silt mantle that is characteristic of Pillot soils. They contain more silt and clay than Billett soils.

Meridian loam, 0 to 2 percent slopes (MoA).—This soil is in irregularly shaped areas on stream and river terraces. It has the profile described as representative of the series.

Included with this soil in mapping are a few areas of moderately well drained loams and a few areas of loams that have loamy bands in the substratum. Also included are a few areas of soils that have a darker surface layer than this soil and a few small areas of Billett and Eleva soils.

Available water capacity is moderate, and natural fertility is medium.

This soil is suited to corn and other row crops. Capability unit IIs–1; woodland group 12; wildlife group 1.

Meridian loam, 2 to 6 percent slopes (MdB).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is slightly thinner.

Included with this soil in mapping are a few areas of eroded soils and a few small areas of Billett and Eleva soils. Also included are a few areas of soils that have a darker surface layer than this soil and a few areas of soils that have loamy bands in the substratum.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is slight. Downward movement of effluent from septic tanks is restricted where thick, loamy bands are in the substratum.

This soil is suited to corn, oats, alfalfa, and soybeans. The areas are generally used for corn and soybeans. Control of erosion is a good management practice. Capability unit IIe–2; woodland group 12; wildlife group 1.

Meridian loam, 6 to 12 percent slopes, eroded (MdC2).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is slightly thinner.

Included with this soil in mapping are a few areas of soils that have a darker surface layer than this soil and a few small areas of Billett and Eleva soils. Also included are small areas of soils that are less sloping or more sloping than this Meridian soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is moderate.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of organic-matter content are good management practices. Capability unit IIIe–2; woodland group 12; wildlife group 1.

Morocco Series

The Morocco series consists of nearly level to gently sloping, somewhat poorly drained soils on river and stream terraces. These soils formed in deep, sandy

sediment. The native vegetation was mainly moist-land grasses and a mixture of trees, such as aspen, silver maple, ash, and a few stands of white pine.

In a representative profile the surface layer is very dark grayish-brown loamy sand about 5 inches thick. The subsoil, about 11 inches thick, is dark-brown loamy sand that has brown and dark grayish-brown mottles. This sand is underlain by pale-brown loose sand that has strong-brown mottles.

Permeability is rapid where the water table is high, but percolation of water is slow during wet seasons. Available water capacity and natural fertility are low. Ditches help to adequately drain these soils during wet seasons.

Morocco soils are suited to pasture grasses and to red and white pine trees of good quality. If adequately drained, these soils are suited to row crops, such as corn.

Representative profile of Morocco loamy sand, 0 to 3 percent slopes, in an old pasture near the Black River bottoms in NW¼SE¼ sec. 33, T. 18 N., R. 8 W.:

A1—0 to 5 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, fine, crumb structure that parts to single grained; very friable; strongly acid; clear, smooth boundary.

B—5 to 16 inches, dark-brown (10YR 4/3) loamy sand that has common, large, distinct, strong-brown (7.5YR 5/8) and faint, dark grayish-brown (10YR 4/2) mottles; weak, coarse and medium, subangular blocky structure that parts to single grained; very friable; medium acid; abrupt, smooth boundary.

C—16 to 60 inches, pale-brown (10YR 6/3) medium sand that has few, coarse, distinct, strong-brown (7.5YR 5/8) mottles; single grained; loose; medium acid.

The Ap horizon, where present, ranges from very dark grayish brown (10YR 3/2) to dark brown (10YR 4/3). The A horizon ranges from 3 to 6 inches in thickness. It commonly is medium acid to very strongly acid, but it is neutral in limed fields. The A1 horizon ranges from very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2). The B and C horizons have high-chroma mottles.

Morocco soils are adjacent to Sparta soils, mottled subsoil variant, and to Wet alluvial land. Morocco soils have a higher water table and are more poorly drained than Sparta soils, mottled subsoil variant. They have less silt and clay and are better drained than Wet alluvial land.

Morocco loamy sand, 0 to 3 percent slopes (MoA).—This soil is in depressions and drainageways on low stream and river terraces.

Included with this soil in mapping are a few areas of loamy sand that have a thicker and darker surface layer than this soil and a few areas of soils that have loamy bands in the loose, sandy substratum. Also included are small areas of Wet alluvial land and Sparta soils, mottled subsoil variant.

This soil has a seasonally high water table. Available water capacity and natural fertility are low. Open ditches help to adequately drain this soil. Plowing under crop residue, using heavy applications of manure and fertilizer, and planting shelterbelts help to maintain fertility and to control erosion.

Many areas of this soil are in trees and brush or are used for pasture. A few small areas have been planted to red and white pines. Where adequately drained, this soil is suited to such crops as corn, oats, and alfalfa. Capability unit IVw–5; woodland group 8; wildlife group 5a.

Muscatine Series

The Muscatine series consists of nearly level to gently sloping, somewhat poorly drained soils on valley benches. The soils formed in deep, silty sediment. The native vegetation was moist-land prairie grasses, tall shrubs, and a few trees, such as silver maple, elm, and ash.

In a representative profile the surface layer is about 15 inches thick. It is very dark grayish-brown silt loam in the upper part and very dark brown silt loam in the lower part. The subsoil is about 30 inches thick. It is brown silt loam in the upper part, yellowish-brown to dark yellowish-brown silty clay loam that has dark-brown to yellowish-brown mottles in the middle part, and grayish-brown heavy silt loam that has dark-brown to gray mottles in the lower part. The underlying material is grayish-brown silt loam that has yellowish-brown and reddish-brown mottles and concretions.

Permeability is moderate, but percolation of water is slow where the water table is high in wet seasons. Available water capacity and natural fertility are high. These soils are wet for short periods in areas where runoff concentrates. Tile and shallow surface drains permit early tillage of these soils.

Muscatine soils are suited to row crops, such as corn.

Representative profile of Muscatine silt loam, 0 to 3 percent slopes, in a depression on a valley bench north of Beaver Creek, 60 yards west of a county road in NW¼SW¼ sec. 4, T. 19 N., R. 8 W.:

Ap—0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, subangular blocky structure that parts to moderate, medium, granular; friable; many roots; neutral; abrupt, smooth boundary.

A12—10 to 15 inches, very dark brown (10YR 2/2) silt loam; moderate, fine, subangular blocky structure that parts to moderate, medium, granular; friable; many roots; neutral; clear, wavy boundary.

B1—15 to 18 inches, brown (10YR 4/3) silt loam; weak, medium, prismatic structure that parts to weak, fine, subangular blocky; thin, continuous, very dark brown (10YR 2/2) coatings on ped faces; friable; many roots; slightly acid; clear, wavy boundary.

B21t—18 to 24 inches, yellowish-brown (10YR 5/4) light silty clay loam; few, fine, distinct, grayish-brown (10YR 5/2) and dark-brown (7.5YR 4/4) mottles; weak, medium, prismatic structure that parts to moderate, fine, subangular blocky; many, thin, continuous clay films on ped faces; firm; common roots; medium acid; clear, wavy boundary.

B22t—24 to 36 inches, dark yellowish-brown (10YR 4/4), light silty clay loam; many, medium, distinct, grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure that parts to moderate, fine, subangular blocky; firm; common roots; strongly acid; clear, wavy boundary.

B3g—36 to 45 inches, grayish-brown (10YR 5/2) heavy silt loam; many, medium, distinct and prominent, gray (10YR 6/1), dark-brown (7.5YR 4/4), strong-brown (7.5YR 5/6), and yellowish-red (5YR 4/6) mottles; weak, medium, subangular blocky structure; friable; few roots; medium acid; gradual, wavy boundary.

Cg—45 to 60 inches, grayish-brown (10YR 5/2) silt loam; many, fine, distinct, yellowish-brown (10YR 5/4 to 5/6) mottles; massive; common, dark reddish-brown (5YR 3/4) concretions; friable; medium acid.

The solum ranges from 36 to 48 inches in thickness. The silty sediment ranges from 4 to 12 feet in thickness.

The A horizon ranges from very dark grayish brown (10YR 3/2) in the upper part to very dark brown (10YR 2/2) in the lower part. The A horizon ranges from 10 to 20 inches in thickness. It is generally medium acid to slightly acid, but it is neutral in limed fields. The Bt horizon is dark yellowish-brown (10YR 4/4) or yellowish-brown (10YR 5/4) heavy silt loam or silty clay loam that has mottles of high and low chroma. The Bg horizon is dark grayish brown (10YR 4/2) or grayish brown (10YR 5/2).

Muscatine soils are adjacent to Downs, Boaz, and Ettrick soils. Muscatine soils have poorer drainage and a thicker surface layer than Downs soils. Muscatine soils have better drainage than Ettrick soils. They have a B2t horizon that the Boaz soils lack, and they have a thicker, darker colored surface layer than Boaz soils.

Muscatine silt loam, 0 to 3 percent slopes (MuA).—This soil is in irregularly shaped areas in depressions and drainageways on valley benches.

Included with this soil in mapping are a few small areas of Downs, Boaz, and Ettrick soils.

This soil has a seasonally high water table and is wet for intermittent periods in areas where runoff concentrates. Permeability is moderate, but percolation of water is slow where the water table is high, especially in wet seasons.

This soil is suited to row crops, such as corn. Capability unit IIw–2; woodland group 9; wildlife group 5a.

Norden Series

The Norden series consists of gently sloping to steep, well-drained soils on uplands. These soils formed in loamy residuum underlain by soft, shaly sandstone. Generally, the shaly sandstone is at an intermediate elevation between the valley bottoms and high limestone ridges. In many areas there is a shallow silt mantle. The native vegetation was hardwoods, mainly red and white oaks.

In a representative profile the plow layer is very dark grayish-brown silt loam about 9 inches thick. The subsurface layer is brown, platy silt loam about 3 inches thick. The subsoil is brown loam about 18 inches thick. It is underlain by olive-yellow to light olive-brown shaly sandstone.

Permeability is moderate. Available water capacity is moderate, and natural fertility is medium. Potassium is available for plant growth where glauconite decomposes in the subsoil and substratum. Residuum in the subsoil and in the substratum is unstable when wet.

Most areas of Norden soils are moderately steep to steep and are used for hay, pasture, or woodland. The nearly level to sloping areas are mainly in corn, oats, and alfalfa.

Representative profile of Norden silt loam, 6 to 12 percent slopes, eroded, on a low slope on uplands, in the NE¼NW¼ sec. 24, T. 24 N., R. 9 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) silt loam, brown (10YR 5/3) when dry; medium, subangular blocky structure that parts to fine, granular; friable; medium acid; abrupt, smooth boundary.

A2—9 to 12 inches, brown (10YR 4/3) silt loam; weak, medium, platy structure that parts to moderate, fine, subangular blocky and to fine, granular; friable; medium acid; clear, smooth boundary.

IIB2t—12 to 20 inches, dark-brown (7.5YR 4/4) loam; medium, subangular blocky structure that parts to fine, subangular blocky; few, thin, patchy clay films on ped faces; friable; strongly acid; gradual, smooth boundary.

IIB3—20 to 30 inches, dark-brown (7.5YR 4/4) loam; moderate, medium, subangular blocky structure; friable; slightly hard when dry; medium acid; gradual, smooth boundary.

R—30 to 60 inches, olive-yellow (2.5Y 6/6) to light olive-brown (2.5Y 5/6), soft, fine-grained sandstone bedrock.

The solum ranges from 20 to 36 inches in thickness. Content of glauconite in the residuum varies. In those areas that have a small amount of glauconite, the residuum is more sandy and more siliceous than in others. The silt mantle ranges from 0 to 20 inches in thickness.

The Ap horizon is very dark grayish brown (10YR 3/2), dark brown (10YR 3/3), or dark grayish brown (10YR 4/2). It has a dry value of more than 5 and a dry chroma of more than 3. The A horizon is very fine sandy loam, loam, or silt loam. Where present, the A1 horizon is very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2), or very dark gray (10YR 3/1) and ranges from 1 to 4 inches in thickness. The Ap horizon commonly is medium acid to slightly acid, but in some limed areas it is neutral in reaction. In cultivated areas, all or most of the material from the A2 horizon is mixed with that in the Ap horizon, and the Ap horizon is darker than the A2 horizon. The Bt horizon is dark-brown (7.5YR 4/4) to yellowish-brown (10YR 5/4) loam or heavy loam.

Norden soils are adjacent to Hixton, Gale, La Farge, and Fayette soils. Norden soils are underlain by less acid, finer grained sandstone than Hixton and Gale soils. Norden soils formed mainly in sandstone residuum, but La Farge soils formed mainly in silt deposits laid down by wind, and Fayette soils typically formed in deep silt deposits laid down by wind.

Norden loam, 4 to 12 percent slopes, eroded (NoC2).—This soil is in irregularly shaped areas, generally on ridgetops. In some areas, mostly in the northern part of the county, this soil is on low valley slopes. It has a profile similar to the one described as representative of the series, but the surface layer is loam rather than silt loam and is slightly lighter colored. In some areas where this soil is cultivated, material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of soils that have a darker surface layer and a few areas of loams that have a loamy substratum. Also included are a few small areas of La Farge and Gale soils and a few small areas of soils that are less sloping or more sloping than this Norden soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIIe–2; woodland group 1; wildlife group 1.

Norden loam, 12 to 20 percent slopes, eroded (NoD2).—This soil is in uniformly shaped areas on ridges and valley slopes. It has a profile similar to the one described as representative of the series, but the surface layer is slightly lighter colored and is loam. In some areas where this soil is cultivated, material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of

soils that have a dark-colored surface layer and a few areas of loams that have a loamy substratum. Also included are a few small areas of Gale and La Farge soils and a few small areas of soils that are less sloping or more sloping than this Norden soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to alfalfa and grasses. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–2; woodland group 1; wildlife group 1.

Norden silt loam, 2 to 6 percent slopes, eroded (NrB2).—This soil is in irregularly shaped areas on ridgetops and on low valley slopes. It has a profile similar to the one described as representative of the series, but the subsoil is slightly thicker. In some areas where this soil is cultivated, material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of soils that have a dark-colored surface layer and a few small areas of Urne, La Farge, and Gale soils. Also included are a few small areas of soils that are more sloping than this Norden soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is slight. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to corn, oats, and alfalfa. It commonly is used for corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIe–2; woodland group 1; wildlife group 1.

Norden silt loam, 6 to 12 percent slopes, eroded (NrC2).—This soil is in irregularly shaped areas on ridgetops and low valley slopes. It has the profile described as representative for the series. In some areas where this soil is cultivated, material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of soils that have a dark-colored surface layer and a few small areas of Gale and La Farge soils. Also included are a few small areas of soils that are less sloping or more sloping than this Norden soil.

The hazard of erosion is moderate. In some places the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIIe–2; woodland group 1; wildlife group 1.

Norden silt loam, 12 to 20 percent slopes, eroded (NrD2).—This soil is in uniformly shaped areas on ridges and valley slopes. It has a profile similar to the one described as representative of the series, but the surface layer is slightly lighter in color. In most areas where this soil is cultivated, material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of soils that have a dark-colored surface layer and a few small areas of Urne, Gale, and La Farge soils. Also included are a few small areas of soils that are less sloping or more sloping than this Norden soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is severe. In most places the tilth and organic-matter content of the surface layer have been adversely affected by erosion. The sandstone residuum is unstable when wet. Where this soil is cultivated intensively, small gullies form in drainageways.

This soil is suited to alfalfa and grasses. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–2; woodland group 1; wildlife group 1.

Norden silt loam, 20 to 30 percent slopes, eroded (NrE2).—This soil is in uniformly shaped areas on steep ridges and valley slopes. It has a profile similar to the one described as representative of the series, but the surface layer is lighter in color and depth to bedrock is less.

Included with this soil in mapping are a few areas of soils that have a dark-colored surface layer and a few small areas of Urne and Gale soils. Also included are small areas of soils that are less sloping or more sloping than this Norden soil.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is severe. In most areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. The sandstone residuum is unstable when wet. Where this soil has been disturbed, small gullies have formed in drainageways.

This soil is suited to grasses and alfalfa for pasture. It is also well suited to hardwoods, such as red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIe–2; woodland group 1; wildlife group 1.

Palms Series

The Palms series consists of nearly level, very poorly drained, muck soils on bottom lands and flood plains along streams and rivers. The soils formed in deposits of organic matter that are underlain by loamy sediment. The native vegetation was wetland grasses, sedges, rushes, and a mixture of tall shrubs. In Tamarack Valley and in a few small areas, the native vegetation was tamarack trees and the ground cover was mosses.

In a representative profile this soil is black muck about 32 inches thick. The underlying material is black silt loam.

Permeability is moderately rapid, but percolation of water is slow where the water table is high. Available water capacity is very high. Palms soils have high shrink-swell potential and high compressibility. Natural fertility is medium.

Most areas of Palms soils are used for wetland pasture, as wildlife habitat, and for water storage basins. Where adequately drained, these soils are suited to corn.

Representative profile of Palms muck in a nearly level meadow of sedge along a creek in NW¼SE¼ sec. 30, T. 23 N., R. 9 W.:

Oa1—0 to 4 inches, black (N 2/0) sapric material; moderate, coarse to fine, granular structure; friable; many roots; slightly acid; clear, smooth boundary.

Oa2—4 to 10 inches, black (N 2/0) sapric material; strong, coarse, prismatic structure that parts to strong,

coarse, subangular blocky; friable; common roots; slightly acid; clear, smooth boundary.

Oa3—10 to 14 inches, black (N 2/0) sapric material; strong, very coarse, platy structure that parts to moderate, thick, platy; thin, patchy organic films on horizontal ped faces; friable; common roots; slightly acid; clear, smooth boundary.

Oa4—14 to 19 inches, black (10YR 2/1) sapric material that has common, fine to coarse, dark reddish-brown (5YR 3/4) herbaceous fibers; 20 percent fiber content reduced to less than 5 percent by rubbing; strong, very coarse, platy structure; slightly acid; abrupt, smooth boundary.

Oa5—19 to 32 inches, black (N 2/0) sapric material; many, fine to coarse, dark yellowish-brown (10YR 4/4) herbaceous fibers; 25 percent fiber content reduced to less than 5 percent by rubbing; massive; slightly acid; abrupt, smooth boundary.

IIC—32 to 60 inches, black (N 2/0) silt loam; massive; mildly alkaline.

The solum ranges from 24 to 52 inches in thickness.

The Oa1 horizon is granular sapric material that ranges from 4 to 12 inches in thickness and is black (N 2/0), dark gray (7.5YR to 10YR 3/1), dark brown (7.5YR 2/2), or very dark brown (10YR 2/2). It commonly is slightly acid or neutral, but in limed areas it is slightly alkaline or neutral in reaction. The underlying organic layers are black (N 2/0), dark-gray (10YR 3/1), or very dark brown (7.5YR to 10YR 2/2) sapric material. In some areas the Oa4 layer has bands of very dark brown (7.5YR to 10YR 2/2), dark grayish-brown (10YR 4/2), dark yellowish-brown (10YR 4/4), dark reddish-brown (5YR 3/4), or dark-brown (7.5YR 4/4) hemic and fibric materials. Where the water table is lowered somewhat, the Oa4 layer has granular or platy structure or prismatic structure that parts to medium and coarse, subangular blocky. The Oa5 layer is massive sapric material that has a few bands of hemic fibric material and is underlain by stratified sediment of very fine sand, silt, and silty clay.

Palms soils are adjacent to poorly drained Houghton, Wallkill, and Ettrick soils and areas of Wet alluvial land. They formed in thinner deposits of organic matter than Houghton soils. They lack the silty alluvium underlain by deposits of organic matter that is typical of Wallkill soils. They lack the deep silty alluvium that is typical of Ettrick soils. Palms soils lack the stratified, recent alluvium that is typical of Wet alluvial land.

Palms muck (Pa).—This nearly level soil is in uniformly shaped areas on bottom lands and flood plains. It has the profile described as representative for the series.

Included with this soil in mapping are a few small areas of Houghton and Wallkill soils and of Wet alluvial land. Also included are a few areas of soils that are underlain by sand, a few areas of peat, and a few areas that have slopes of slightly more than 2 percent.

The water table is at or near the surface in most areas. In a few areas the water table has been lowered by stream entrenchment or other natural conditions. The hazards of erosion along streams and of soil blowing in cultivated areas are severe. The hazard of subsidence of cultivated tracts is moderate. A few areas of shallow muck that are underlain by loamy sand or sand are not suited to drainage and cultivation.

Most areas of this soil are used for wetland pasture, as wildlife habitat, and for water storage basins. Where drained, this soil is suited to corn. Control of erosion along streambanks and in cultivated areas is a good management practice. Capability unit IIw–8; woodland group 10; wildlife group 6.

Palsgrove Series

The Palsgrove series consists of gently sloping to moderately steep, well-drained soils on the top and sides of ridges. These soils formed mainly in silty loess and clay residuum underlain at a depth of more than 60 inches by limestone bedrock. The most prominent limestone uplands are Oak and Arcadia Ridges in the southern part of the county. The native vegetation was hardwood trees, mainly red and white oaks.

In a representative profile the plow layer is dark grayish-brown silt loam about 8 inches thick. The subsurface layer is brown, platy silt loam about 4 inches thick. The subsoil is about 41 inches thick. It is brown silt loam in the upper part, dark yellowish-brown and brown silty clay loam in the middle part, and yellowish-red and dark reddish-brown clay in the lower part. It is underlain by yellowish-red clay residuum weathered from limestone.

Permeability is moderately slow. Available water capacity and natural fertility are high.

Most areas of these soils are in corn, oats, and alfalfa. The underlying dolomitic limestone is quarried and crushed for road fill.

Representative profile of Palsgrove silt loam, 2 to 6 percent slopes, in a plowed field 1,000 feet south of intersection of County Highway G and State Highway 93, 200 feet east of State Highway 93 in SE¼SE¼ sec. 16, T. 20 N., R. 9 W.:

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium and fine, granular structure; very friable; many roots; medium acid; abrupt, wavy boundary.

A2—8 to 12 inches, brown (10YR 5/3) silt loam; moderate, thin, platy structure; very friable; many roots; medium acid; clear, wavy boundary.

B1—12 to 19 inches, brown (10YR 4/3) heavy silt loam; moderate, medium and fine, subangular blocky structure; firm; many roots; medium acid; clear, wavy boundary.

B21t—19 to 27 inches, dark yellowish-brown (10YR 4/4) to brown (7.5YR 4/4) light silty clay loam; strong, medium and fine, subangular blocky structure; few, continuous, light yellowish-brown (10YR 6/4) to brown (7.5YR 4/4) clay films on ped faces; firm; common roots; medium acid; abrupt, smooth boundary.

B22t—27 to 38 inches, dark yellowish-brown (10YR 4/4) to brown (7.5YR 4/4) light silty clay loam; strong, coarse, subangular blocky structure; many continuous, dark yellowish-brown (10YR 4/4) and brown (7.5YR 4/4) clay films on ped faces; firm; common roots; few chert fragments of pebble size; medium acid; abrupt, smooth boundary.

IIB23t—38 to 42 inches, dark reddish-brown (5YR 3/4) clay; strong, coarse, angular blocky structure; few, continuous, brown (10YR 4/3) clay films on ped faces; very firm; few roots; few chert fragments of pebble size; medium acid; clear, smooth boundary.

IIB3t—42 to 53 inches, yellowish-red (5YR 5/6) clay; strong, coarse, prismatic structure; thin clay films; very firm; few roots; few chert fragments of pebble size; medium acid; gradual, wavy boundary.

IIC—53 to 60 inches, yellowish-red (5YR 4/6) clay; common, medium, prominent, light-gray (10YR 7/2) mottles; massive; very firm; few roots; few chert fragments of pebble size; medium acid.

The Ap horizon is dark brown (10YR 3/3), very dark grayish brown (10YR 3/2), or dark grayish brown (10YR 4/2). It has a dry value greater than 5 and a dry chroma greater than 3. In uncultivated areas the A1 horizon is very dark brown (10YR 2/2) or very dark gray (10YR 3/1) and is 3 to 6 inches thick. The silty loess mantle ranges from 30 to 50 inches in thickness. Beneath this mantle is clayey limestone residuum, which is underlain at a depth of 5 to 12 feet by limestone bedrock.

Palsgrove soils are adjacent to Palsgrove soils, clayey subsoil variant, Seaton soils, and Stony and rocky land. Palsgrove soils have a thicker mantle of silt than Palsgrove soils, clayey subsoil variant. They did not form in deep silt more than 50 inches thick, as did Fayette soils. Palsgrove soils are deeper, less variable, and have more silt and clay than Stony and rocky land.

Palsgrove silt loam, 2 to 6 percent slopes (PgB).—This soil is in irregularly shaped areas on ridgetops of limestone uplands. It has the profile described as representative for the series.

Included with this soil in mapping are a few areas of soils that have a darker surface layer and a few areas of eroded Palsgrove soils. Also included are a few areas of Palsgrove soils, clayey subsoil variant, and a few small areas of soils that are less sloping or more sloping than this Palsgrove soil.

Permeability is moderately slow. The hazard of erosion is slight.

This soil is suited to corn, oats, and alfalfa. It commonly is used for corn. Control of erosion is a good management practice. Capability unit IIe–1; woodland group 1; wildlife group 1.

Palsgrove silt loam, 6 to 12 percent slopes, eroded (PgC2).—This soil is in irregularly shaped areas on limestone ridges. It has a profile similar to the one described as representative of the series, but the surface layer is thinner. In some areas where this soil is cultivated, part of the material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are some areas of uneroded Palsgrove soils and a few small areas of Palsgrove soils, clayey subsoil variant. Also included are areas of soils that are less sloping or more sloping than this Palsgrove soil.

The hazard of erosion is moderate. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. Permeability is moderately slow.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIIe–1; woodland group 1; wildlife group 1.

Palsgrove silt loam, 12 to 20 percent slopes, eroded (PgD2).—This soil is in irregularly shaped areas on the sides of limestone ridges. It has a profile similar to the one described as representative of the series, but the surface layer is thinner. Where the soil is cultivated, part of the material from the subsoil is mixed into the plow layer.

Included with this soil in mapping are a few areas of uneroded Palsgrove soils and a few small areas of Palsgrove soils, clayey subsoil variant. Also included are some areas of soils that have limestone bedrock at a depth of less than 60 inches, and a few small areas of soils that are less sloping or more sloping than this Palsgrove soil.

The hazard of erosion is severe. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. Permeability is moderately slow.

This soil is suited to alfalfa and grasses for pasture and hay. Control of erosion and maintenance of tilth are good management practices. Capability unit IVe–1; woodland group 1; wildlife group 1.

Palsgrove Series, Clayey Subsoil Variant

The Palsgrove series, clayey subsoil variant, consists of gently sloping to steep, well-drained soils on the top and sides of ridges. The soils formed in silty loess and clay residuum underlain at a depth of more than 60 inches by limestone bedrock. The most prominent limestone uplands are Oak and Arcadia Ridges in the southern part of the county. The native vegetation was hardwood trees, mainly red and white oaks.

In a representative profile the plow layer is very dark grayish-brown and dark-brown silt loam about 8 inches thick. The subsoil is about 32 inches thick. It is brown silty clay loam in the upper part and reddish-brown and dark-brown clay in the lower part. It is underlain by yellowish-red clay residuum weathered from limestone bedrock.

Permeability is moderately slow. Available water capacity is moderate, and natural fertility is high.

Most gently sloping to sloping areas are in corn, oats, and alfalfa. Most moderately steep and steep areas are in pasture and woodland. The underlying dolomitic limestone is quarried and crushed for road fill.

Representative profile of Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes, 70 yards north of County Highway G in NW¼SE¼ sec. 16, T. 20 N., R. 9 W.:

Ap1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine and very fine, subangular blocky structure; friable; many roots; neutral; abrupt, smooth boundary.

Ap2—2 to 6 inches, dark-brown (10YR 3/3) and very dark grayish-brown (10YR 3/2) silt loam; weak and moderate, fine, platy structure that parts to weak, very fine, subangular blocky; friable; many roots; neutral; clear, smooth boundary.

AB—6 to 8 inches, brown (10YR 4/3–5/3) silt loam; weak, medium, platy and subangular blocky structure; grayish-brown (10YR 5/2) silt particles on ped faces; friable; neutral; clear, smooth boundary.

B21—8 to 15 inches, brown (10YR 4/3) silty clay loam; moderate, medium and fine, subangular blocky structure; many bleached silt grains and few, thin, patchy, brown clay films on ped faces; friable; slightly acid; gradual, smooth boundary.

IIB22t—15 to 20 inches, reddish-brown (5YR 4/4) and dark-brown (7.5YR 4/4) clay; few chert fragments and small iron concretions; weak and medium, moderate, subangular blocky structure; many, thick, continuous, dark-brown clay films; very firm; strongly acid; clear, wavy boundary.

IIB23t—20 to 25 inches, reddish-brown (5YR 4/4) and dark-brown (7.5YR 4/4) clay; strong, medium, prismatic structure that parts to moderate, medium, subangular and angular blocky; common chert fragments; thin and moderately thick, continuous, yellowish-red and dark-brown clay films on ped faces; very firm; mildly alkaline; gradual, wavy boundary.

IIB24t—25 to 40 inches, reddish-brown (5YR 4/4) and dark-brown (7.5YR 4/4) clay; strong, coarse, prismatic structure that parts to strong, medium, subangular blocky and blocky; common chert fragments; moderately thick, continuous, yellowish-red and dark-brown clay films on ped faces; fragments of chert and weathered limestone; very firm; mildly alkaline; gradual, wavy boundary.

IIC—40 to 60 inches, yellowish-red (5YR 4/8) clay, limestone residuum; massive; mildly alkaline.

The Ap horizon is dark brown (10YR 3/3), very dark grayish brown (10YR 3/2), or dark grayish brown (10YR

4/2). It has a dry value greater than 5 and a dry chroma greater than 3. In uncultivated areas the A1 horizon is very dark brown (10YR 2/2) or very dark gray (10YR 3/1) and ranges from 3 to 5 inches in thickness. The A horizon commonly is neutral, but the Ap horizon ranges from neutral to medium acid. The mantle of silty loess ranges from 15 to 30 inches in thickness. It is underlain by clay residuum that is underlain at a depth of 5 to 12 feet by limestone bedrock.

Palsgrove soils, clayey subsoil variant, are adjacent to Palsgrove, Fayette, and Seaton soils and to areas of Stony and rocky land. Palsgrove soils, clayey subsoil variant, have a thinner silt mantle than Palsgrove soils. They did not form in deep silty loess more than 50 inches thick, as did Fayette and Seaton soils. Palsgrove soils, clayey subsoil variant, are deeper, less variable, and have more silt and clay than Stony and rocky land.

Palsgrove silt loam, clayey subsoil variant, 2 to 6 percent slopes (PlB).—This soil is in irregularly shaped areas on ridgetops of limestone uplands. It has a profile similar to the one described as representative of the series, but the silt mantle is slightly thicker.

Included with this soil in mapping are a few small areas of Palsgrove soils and of Stony and rocky land.

Permeability is moderately slow. The hazard of erosion is slight.

This soil is well suited to corn, oats, and alfalfa. Most areas are used for corn. Capability unit IIe–1; woodland group 1; wildlife group 1.

Palsgrove silt loam, clayey subsoil variant, 6 to 12 percent slopes (PlC).—This soil is in irregularly shaped areas on limestone ridges. It has a profile similar to the one described as representative for the series, but the mantle of silt is thicker and the surface layer is thinner and slightly darker.

Included with this soil in mapping are a few areas of eroded soils and a few small areas of Palsgrove soils and Stony and rocky land. Also included are a few small areas of soils that are less sloping or more sloping than this Palsgrove soil, clayey subsoil variant.

Permeability is moderately slow. The hazard of erosion is moderate.

Most areas of this soil are in trees. This soil is commonly in small isolated areas, and it is well suited to trees. Where cultivated, this soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion is a good management practice. Capability unit IIIe–1; woodland group 1; wildlife group 1.

Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes (PlD).—This soil is in small, irregularly shaped areas on side slopes of limestone ridges. It has the profile described as representative for the series.

Included with this soil in mapping are a few small areas of Palsgrove and Seaton soils. Also included are a few small areas of shallow and moderately deep clayey soils that are underlain by limestone bedrock and a few small areas of soils that are less sloping or more sloping than this Palsgrove soil, clayey subsoil variant.

The hazard of erosion is severe. Permeability is moderately slow.

Most areas of this soil are in pasture and trees. This soil is well suited to grasses and alfalfa for hay or pasture. Control of erosion is a good management practice. Capability unit IVe–1; woodland group 1; wildlife group 1.

Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes, eroded (PlD2).—This soil is in irregularly shaped areas on the sides of limestone ridges. It has a profile similar to the one described as representative of the series, but the surface layer is lighter colored. In some areas where this soil is cultivated, part of the material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of Palsgrove and Seaton soils. Also included are a few small areas of shallow and moderately deep soils that are underlain by limestone bedrock, and a few small areas of soils that are less sloping or more sloping than this Palsgrove soil, clayey subsoil variant.

The hazard of erosion is severe. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. Permeability is moderately slow.

Most areas of this soil are in crops and pasture. This soil is suited to grasses and alfalfa for hay and pasture. Control of erosion annd maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–1; woodland group 1; wildlife group 1.

Palsgrove silt loam, clayey subsoil variant, 20 to 30 percent slopes (PlE).—This soil is in uniformly shaped areas on the sides of limestone ridges. It has a profile similar to the one described as representative for the series, but the surface layer is thinner and darker, and in many areas depth to limestone bedrock is less than 60 inches.

Included with this soil in mapping are a few areas of eroded soils and a few areas of Palsgrove soils. Also included are a few small areas of Seaton soils and a few small areas of soils that are less sloping or more sloping than this Palsgrove soil, clayey subsoil variant.

The hazard of erosion is very severe. Permeability is moderately slow. In a few areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

Most of this soil is in woodland. This soil is well suited to hardwoods, mainly red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion is a good management practice. Capability unit VIe–1; woodland group 1; wildlife group 1.

Palsgrove soils, clayey subsoil variant, 12 to 20 percent slopes, severely eroded (PnD3).—This soil is in irregularly shaped areas on the sides of limestone ridges. It has a profile similar to the one described as representative for the series, but the surface layer is more variable and is lighter colored, and the subsoil is thinner. In most areas where this soil is cultivated, clayey material from the subsoil is mixed with the material in the plow layer.

Included with this soil in mapping are a few areas of soils that have limestone bedrock at a depth of less than 60 inches and a few small areas of Stony and rocky land. Also included are a few small areas of Palsgrove and Seaton soils and a few small areas of soils that are less sloping or more sloping than this Palsgrove soil.

The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been

adversely affected by erosion. This soil has poor tilth, and preparing a seedbed is difficult. Permeability is moderately slow.

Most areas of this soil are in crops and pasture. This soil is suited to grasses and alfalfa for pasture. It is also well suited to hardwoods, such as red and white oaks. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit VIe–1; woodland group 1; wildlife group 1.

Pillot Series

The Pillot series consists of nearly level to sloping, well-drained soils on high stream and river terraces. These soils mainly formed in silty sediment underlain at a depth of about 34 inches by loose sand. The native vegetation was oak savanna and prairie grasses.

In a representative profile the surface layer is very dark gray silt loam about 11 inches thick. The subsoil is about 23 inches thick. It is brown silt loam in the upper part, dark yellowish-brown silty clay loam in the middle part, and brown heavy loam in the lower part. It is underlain by light-gray medium sand.

Permeability is moderate in the upper silty part of these soils and rapid in the lower sandy part. Available water capacity is moderate and natural fertility is medium.

Pillot soils are suited to corn, oats, and alfalfa.

Representative profile of Pillot silt loam, 0 to 2 percent slopes, on the south end of courthouse lawn in Whitehall in SE¼SW¼ sec. 23, T. 22 N., R. 8 W.:

A1—0 to 11 inches, very dark gray (10YR 3/1) silt loam; moderate, course, granular structure that parts to moderate, fine, granular; friable; many fibrous roots; neutral; abrupt, smooth boundary.

B21—11 to 17 inches, brown (10YR 4/3) silt loam; moderate, fine, subangular blocky structure; few, patchy, thin, dark yellowish-brown (10YR 3/4) clay films on ped faces; few dark yellowish-brown (10YR 3/4) earthworm casts; friable; few roots; strongly acid; clear, smooth boundary.

B22t—17 to 26 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, medium and fine, subangular blocky structure; many patchy, dark yellowish-brown (10YR 3/4) clay films on ped faces; friable; very strongly acid; gradual, smooth boundary.

IIB3—26 to 34 inches, brown (10YR 5/3) heavy loam; moderate, coarse, subangular blocky structure; few, continuous, dark yellowish-brown (10YR 4/4) clay films on ped faces; friable; very strongly acid; clear, wavy boundary.

IIC—34 to 60 inches; light-gray (10YR 7/2) medium sand; single grained; loose; strongly acid.

The solum ranges from 26 to 36 inches in thickness. The silt mantle ranges from 20 to 36 inches in thickness.

The A horizon ranges from very dark brown (10YR 2/2) to very dark gray (10YR 3/1) or very dark grayish brown (10YR 3/2) in color and from 10 to 14 inches in thickness. It commonly is medium acid or slightly acid, but in places limed areas are neutral in reaction. The Bt horizon is dark-brown (7.5YR 4/4) to dark yellowish-brown (10YR 4/4) silty clay loam.

Pillot soils are adjacent to Whitehall, Meridian, Huntsville, and Downs soils. They have a subsoil that does not have a hue of 5YR, but Whitehall soils typically do. Pillot soils have a silt mantle that Meridian soils lack. They have a thinner surface layer than Huntsville soils. Pillot soils formed in moderately deep silt, and Downs soils typically formed in deep silt.

Pillot silt loam, 0 to 2 percent slopes (PoA).—This soil is in irregularly shaped areas on stream and river terraces. It has the profile described as representative for the series.

Included with this soil in mapping are a few areas of moderately well drained silty soils and a few areas of soils that have a lighter colored surface layer than this soil. Also included are a few small areas of Huntsville soils.

Available water capacity is moderate. Permeability is moderate in the silty upper part of this soil and rapid in the sandy lower part.

This soil is suited to row crops, such as corn. Maintenance of tilth and structure is a major concern in areas where this soil is in continuous row crops. Capability unit IIs–1; woodland group 12; wildlife group 4.

Pillot silt loam, 2 to 6 percent slopes (PoB).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is lighter in color.

Included with this soil in mapping are a few areas of eroded soils and a few small areas of Downs and Huntsville soils. Also included are a few small areas of soils that are less sloping or more sloping than this Pillot soil.

Available water capacity is moderate. Permeability is moderate in the upper silty part of this soil and rapid in the lower sandy part. The hazard of water erosion is slight.

This soil is suited to corn, oats, and alfalfa. Many areas are used for corn. Control of erosion is a good management practice. Capability unit IIe–2; woodland group 12; wildlife group 4.

Pillot silt loam, 6 to 12 percent slopes, eroded (PoC2).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is thinner and lighter colored. Because of cultivation and erosion, in some areas where this soil is cultivated part of the material from the subsoil is mixed with the material in the plow layer.

Included with this soil in mapping are a few areas of uneroded soils and a few areas of Whitehall soils. Also included are a few small areas of Downs and Huntsville soils and a few small areas of soils that are less sloping or more sloping than this Pillot soil.

The hazard of erosion is moderate. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. Available water capacity is moderate. Permeability is moderate in the upper silty part of this soil and rapid in the lower, sandy part.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IIIe–2; woodland group 12; wildlife group 4.

Port Byron Series

The Port Byron series consists of gently sloping to steep, well-drained soils. Most areas of these soils are concave and occur on valley benches and side slopes. A few areas of these soils are on ridges. The soils formed in deep, coarse, silty loess underlain by sandstone bedrock. A few areas of gently sloping soils on valley

benches are underlain at a depth of more than 60 inches by loose sand. The native vegetation was oak savanna.

In a representative profile the surface layer is very dark brown and dark-brown silt loam about 12 inches thick. The subsoil is about 48 inches thick. It is brown silt loam in the upper part and dark yellowish-brown silt loam in the lower part. It is underlain by brown silt loam.

Permeability is moderate. Available water capacity is very high. Natural fertility is high. The coarse silty loess in the substratum and in the lower part of the subsoil is unstable when wet.

Most gently sloping to moderately steep areas of these soils are in corn, oats, and alfalfa. The steep areas are in pasture or woodland.

Representative profile of Port Byron silt loam, 2 to 6 percent slopes, in a cornfield on a valley bench 150 yards west of State Highway No. 93 in the SE¼NE¼ sec. 9, T. 24 N., R. 9 W.:

Ap—0 to 9 inches, very dark brown (10YR 2/2) silt loam; moderate, coarse and medium, subangular blocky structure that parts to weak, medium and fine, granular; very friable; few roots; neutral; abrupt, smooth boundary.

A3—9 to 12 inches, dark-brown (10YR 3/3) silt loam; weak, coarse and medium, subangular blocky structure that parts to weak, medium and fine, granular; very friable; few roots; neutral; clear, wavy boundary.

B21t—12 to 20 inches, brown (10YR 4/3) silt loam; weak, medium and fine, subangular blocky structure; few, thin, patchy, dark-brown clay films on ped faces; very friable; few roots; medium acid; gradual, smooth boundary.

B22t—20 to 40 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, coarse, subangular blocky structure; peds coated with few, thin, continuous, dark-brown clay films; very friable; medium acid; clear, smooth boundary.

B3—40 to 60 inches, brown (10YR 5/3) coarse silt loam; weak, thick, platy structure; very friable; medium acid; clear, smooth boundary.

C—60 to 72 inches, brown (10YR 5/3) coarse silt loam; common, medium, distinct, dark-brown (7.5YR 4/4) mottles; massive; medium acid.

The solum ranges from 36 to 65 inches in thickness. In steep areas the loess mantle has some sand and sandstone pebbles. The loess ranges from 5 to 25 feet in thickness. It is underlain by sandstone bedrock on valley side slopes and by loose sand on some of the valley benches.

The A horizon is very dark brown (10YR 2/2) or dark brown (10YR 3/3) and ranges from 10 to 20 inches in thickness. The Bt horizon ranges from silt loam to heavy silt loam.

The Port Byron soils in Trempealeau County have a slightly higher content of clay than is typical for the Port Byron series.

Port Byron soils are adjacent to Seaton, Worthen, Downs, and La Farge soils. They have a darker and thicker surface layer than Seaton soils. They have a thinner surface layer and a thinner Bt horizon than Worthen soils. They have a thicker surface layer and a Bt horizon that has less clay and more coarse silt than Downs soils. Port Byron soils have a subsoil the lower part of which formed in silt rather than in fine-grained, glauconitic sandstone residuum that is typical of La Farge soils.

Port Byron silt loam, 2 to 6 percent slopes (PrB).—This soil generally is in concave areas on valley benches. A few areas are on ridgetops. It has the profile described as representative of the series.

Included with this soil in mapping are a few areas of eroded soils and a few small areas of Downs and Worthen soils. Also included are a few small areas of soils that are less or more sloping than this Port Byron soil.

The hazard of erosion is slight on this soil.

Most of this soil is in corn. Maintenance of tilth and structure is a major concern where this soil is used for corn or other row crops year after year. Control of erosion is a good management practice. Capability unit IIe–1; woodland group 12; wildlife group 4.

Port Byron silt loam, 6 to 12 percent slopes, eroded (PrC2).—This soil generally is in concave areas on valley benches and side slopes. A few areas are on ridgetops. This soil has a profile similar to the one described as representative of the series, but the surface layer is lighter colored. In small areas where this soil is cultivated, part of the material from the subsoil is generally mixed with that in the plow layer.

Included with this soil in mapping are a few areas of uneroded Port Byron soils and a few small areas of Downs and Seaton soils. Also included are a few small areas of soils that are less sloping or more sloping than this Port Byron soil.

The hazard of erosion is moderate on this soil. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth are good management practices. Capability unit IIIe–1; woodland group 12; wildlife group 4.

Port Byron silt loam, 12 to 20 percent slopes, eroded (PrD2).—This soil is in concave areas on the sides of valleys. These areas commonly are near the upper end of large drainageways. This soil has a profile similar to the one described as representative of the series, but the surface layer is lighter colored. Also the silt mantle is thinner and has more fine sand. Commonly in small areas where this soil is cultivated, the material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of uneroded Port Byron soils and a few small areas of Seaton, Downs, and La Farge soils. Also included are a few small areas of the soils that are less sloping or more sloping than this Port Byron soil.

The hazard of erosion is severe on this soil. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. The silty subsoil and substratum are unstable where saturated with water. Small gullies commonly occur where this soil has been cultivated intensively.

This soil is suited to grasses and alfalfa for hay and pasture. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–1; woodland group 12; wildlife group 4.

Port Byron silt loam, 20 to 30 percent slopes (PrE).—This soil is in concave areas on the sides of valleys. The concave areas commonly are near the upper end of large drainageways. This soil has a profile similar to the one described as representative of the series, but its silt mantle has more fine sand.

Included with this soil in mapping are a few areas of eroded Port Byron soils and a few small areas of La Farge and Gale soils. Also included are a few small areas of soils that are less sloping or more sloping than this Port Byron soil.

The hazard of erosion is severe on this soil. The

coarse, silty subsoil and substratum are unstable where they are wet. In a few areas gullies have formed.

This soil is suited to alfalfa and grasses for pasture. Some areas are in hardwoods, such as red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion is a good management practice. Capability unit VIe–1; woodland group 12; wildlife group 4.

Sandy Alluvial Land

Sandy alluvial land (Sa) is in nearly level areas on the bottom lands of rivers and streams throughout the county. It consists of light-colored and dark-colored, stratified sediment deposited by floodwater. The areas vary in texture, drainage, and reaction, but they are mainly well drained and moderately well drained sand, loamy sand, and sandy loam and range from strongly acid to mildly alkaline.

Included with this land type in mapping are small areas of well-drained Gotham and Sparta soils, moderately well drained Sparta and Huntsville soils, somewhat poorly drained Morocco soils, poorly drained Palms and Houghton soils, and Wet alluvial land, Marsh, and ponds. Also included are small areas of gently sloping soils.

Permeability is rapid, but where the water table is high, percolation of water is slow during wet seasons. Available water capacity is low. Runoff is slow.

Most areas of this land type are in pasture, trees, or brush. The areas are generally subject to flooding, especially early in spring. The hazards of sand deposition and streambank erosion are severe, especially in areas of pasture. Sandy alluvial land is suited to pasture, wildlife habitat, and trees. A few areas are cultivated. Capability unit VIIs–9; woodland group 3; wildlife group 7.

Sandy Terrace Escarpments

Sandy terrace escarpments (Sd) is moderately steep to very steep, long, narrow fronts of terraces near rivers and streams. This land type consists of light-colored and dark-colored, excessively well drained sand or loamy sand. The areas were formed by rivers and streams cutting through sandy terrace soils that are partly altered by erosion and deposition. Most of these areas are along Elk Creek and the Buffalo, Trempealeau, and Mississippi Rivers. The native vegetation was mainly prairie grasses and a few bur and black oaks.

Included with this land type in mapping are small areas of Gotham, Sparta, and Trempe soils.

Available water capacity is low. The hazard of soil blowing is moderate. Runoff is moderately rapid, and the hazard of gully erosion is severe in areas that are in or near natural drainageways.

Most areas of this land type are in pasture and trees. Sandy terrace escarpments have good potential for growing trees or for wildlife habitat. They are suited to red or white pines of medium quality. Capability unit VIIs–3; woodland group 4; wildlife group 3.

Seaton Series

The Seaton series consists of gently sloping to steep, well-drained soils. Most areas of these soils are concave and occur on valley benches and on the sides of valleys. A few areas are on ridges. These soils formed in deep silty loess that is underlain at a depth of more than 60 inches by sandstone bedrock. The native vegetation was hardwoods, mainly red and white oaks.

In a representative profile the plow layer is dark grayish-brown silt loam about 7 inches thick. The subsurface layer is platy silt loam 3 inches thick. The subsoil is about 31 inches thick. It is dark yellowish-brown loam in the upper part and brown silt loam in the lower part. It is underlain by brown silt loam.

Permeability is moderate. Available water capacity is very high. Natural fertility is high. The coarse, silty loess in the substratum and the lower part of the subsoil are unstable where they are wet.

Most gently sloping to moderately steep areas of these soils are in corn, oats, and alfalfa. The steep areas are in pasture or woodland.

Representative profile of Seaton silt loam, 6 to 12 percent slopes, in a bluegrass pasture 200 yards southwest of the northeast corner of NW¼NW¼ sec. 34, T. 24 N., R. 9 W.:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy structure that parts to weak, medium and fine, granular; very friable; many roots; neutral; abrupt, smooth boundary.

A2—7 to 10 inches, brown (10YR 4/3) silt loam; weak, thin, platy structure; very friable; many roots; medium acid; clear, wavy boundary.

B21t—10 to 18 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; coatings of grayish-brown (10YR 5/2) silt particles and few, thin, patchy, dark-brown clay films on ped faces; very friable; strongly acid; gradual, smooth boundary.

B22t—18 to 28 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; coatings of grayish-brown (10YR 5/2) silt particles and many, thin, patchy, dark-brown clay films on ped faces; very friable; strongly acid; gradual, smooth boundary.

B23t—28 to 32 inches, dark yellowish-brown (10YR 4/4) heavy silt loam; weak, medium, subangular blocky structure; coatings of grayish-brown (10YR 5/2) silt particles and few, thin, patchy, dark yellowish-brown clay films on ped faces; very friable; strongly acid; gradual, smooth boundary.

B3—32 to 41 inches, brown (10YR 5/3) silt loam; weak, coarse, subangular blocky structure; coatings of grayish-brown (10YR 5/2) silt particles on ped faces; vesicular; very friable; strongly acid; gradual, smooth boundary.

C—41 to 60 inches, dark yellowish-brown (10YR 4/4) silt loam; massive; vesicular; strongly acid.

The solum ranges from 36 to 48 inches in thickness. In steep areas the coarse loess mantle has some sand and sandstone pebbles. The coarse loess ranges from 5 to 25 feet in thickness. It is underlain by sandstone bedrock on valley sides and by loose sand on valley benches.

In cultivated areas the Ap horizon ranges from very dark grayish brown (10YR 3/2) to dark yellowish brown (10YR 4/4). It has a value of more than 5 and a chroma of more than 3. In uncultivated areas the A1 horizon is very dark brown (10YR 2/2) or very dark gray (10YR 3/1) and ranges from 2 to 4 inches in thickness. The Bt horizon is heavy silt loam or light silty clay loam.

Seaton soils are adjacent to Port Byron, Fayette, and La Farge soils and Stony and rocky land. They have a thinner, lighter colored surface layer and have slightly more clay

in the subsoil than Port Byron soils. Seaton soils have a subsoil that has coarser silt and less clay than that of Fayette soils, and it lacks the loamy sandstone residuum that is typical of La Farge soils. Seaton soils formed in deep silty loess, but Stony and rocky land formed in shallow loamy soil material over bedrock.

Seaton silt loam, 2 to 6 percent slopes (SeB).—This soil is in concave areas on valley benches and the sides of valleys. A few large areas are on ridgetops. These areas are mainly in the northern part of the county near the Buffalo River. This soil has a profile similar to the one described as representative of the series, but the surface layer is slightly darker.

Included with this soil in mapping are small areas of soils, on or near the bottoms of drainageways, that have a darker color than this soil. Also included are a few areas of very fine sandy loam that is underlain by silty sediment and a few small areas of Worthen and Downs soils.

The hazard of erosion is slight.

This soil is well suited to corn, oats, and alfalfa. Most areas of this soil are in corn. Maintenance of tilth and structure is a major concern where corn or other row crops are grown year after year. Control of erosion is a good management practice. Capability unit IIe–1; woodland group 1; wildlife group 1.

Seaton silt loam, 6 to 12 percent slopes (SeC).—This soil is in concave areas on valley benches and the sides of valleys. Most areas are at the upper end of drainageways. A few large areas are on ridgetops in the northern part of the county near the Buffalo River. This soil has the profile described as representative for the series. Where this soil is in narrow areas along drainageways, the surface layer is darker than in other areas.

Included with this soil in mapping are a few areas of very fine sandy loams that are underlain by silty sediment that has some colluvial sand. Also included are a few small areas of Downs soils and a few small areas of soils that are less sloping or more sloping than this Seaton soil.

The hazard of erosion is moderate.

This soil is well suited to oats, alfalfa, and a limited amount of corn. Control of erosion is a good management practice. Capability unit IIIe–1; woodland group 1; wildlife group 1.

Seaton silt loam, 6 to 12 percent slopes, eroded (SeC2).—This soil is in concave areas on valley benches and the sides of valleys. Most of these areas are at the upper end of drainageways. A few large areas occur on ridgetops. These areas are mainly in the northern part of the county near the Buffalo River. This soil has a profile similar to the one described as representative of the series, but the surface layer is thinner. In areas where this soil is cultivated, a part of the material from the subsoil commonly is mixed with that in the plow layer. Where this soil is in narrow areas along drainageways, it has a dark surface layer.

Included with this soil in mapping are very fine sandy loams that are underlain by silty sediment that has some colluvial sand. Also included are a few small areas of Downs soils and a few small areas of soils that are less sloping or more sloping than this Seaton soil.

The hazard of erosion is moderate on this soil. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. The coarse silty subsoil and substratum are unstable where they are wet. Gullies have formed where areas of these soils along natural drainageways have been intensively cultivated.

This soil is suited to oats, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IIIe–1; woodland group 1; wildlife group 1.

Seaton silt loam, 12 to 20 percent slopes, eroded (SeD2).—This soil is in concave areas on the sides of valleys. Most areas are at the upper end of drainageways. A few areas are on the sides of ridges. These areas are mainly in the northern part of the county near the Buffalo River. This soil has a profile similar to the one described as representative of the series, but it has a thinner surface layer. Commonly in areas where this soil is cultivated, the material from the subsoil is mixed with that in the plow layer. Where this soil is in narrow areas along drainageways, it has a dark-colored surface layer.

Included with this soil in mapping are areas of very fine sandy loams that are underlain by silty sediment that has some colluvial sand. Also included are a few areas of uneroded Seaton soils, a few small areas of Downs soils, and a few small areas of soils that are less sloping or more sloping than this Seaton soil.

The hazard of erosion is severe on this soil. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion. The coarse silty subsoil and substratum are unstable in wet areas. Gullies form where this soil is cultivated intensively.

This soil is well suited to alfalfa and grasses for hay and pasture. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–1; woodland group 1; wildlife group 1.

Seaton silt loam, 20 to 30 percent slopes (SeE).—This soil is in concave areas on the sides of valleys. Most areas are at the upper end of drainageways. This soil has a profile similar to the one described as representative of the series, but it has a thinner, darker colored surface layer. Where this soil is along drainageaways. it has a thicker surface layer.

Included with this soil in mapping are a few areas of very fine sandy loams that are underlain by silty sediment that has some colluvial sand. Also included are a few areas of Gale and La Farge soils and a few small areas of soils that are less sloping or more sloping than this Seaton soil.

The hazard of erosion is very severe on this soil. The coarse, silty substratum is unstable where it is wet. A few small gullies have formed in drainageways.

Most of this soil is in pasture and woodland. This soil is well suited to grasses and alfalfa and to such hardwoods as red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion is a good management practice. Capability unit VIe–1; woodland group 1; wildlife group 1.

Seaton silt loam, 20 to 30 percent slopes, eroded (SeE2).—This soil is in concave areas on the sides of

valleys. Most areas are at the upper end of drainageways. This soil has a profile similar to the one described as representative of the series, but it has a thinner surface layer. In some areas a part of the subsoil is exposed at the surface. In a few areas along drainageways, this soil has a dark surface layer.

Included with this soil in mapping are a few areas of very fine sandy loams that are underlain by silty sediment that has some colluvial sand. Also included are a few small areas of Gale and La Farge soils and a few small areas of soils that are less sloping or more sloping than this Seaton soil.

The hazard of erosion is very severe on this soil. The tilth and organic-matter content of the surface layer have been adversely affected by erosion. The coarse silty substratum is unstable where it is wet. Gullies form if this soil is disturbed.

This soil is suited to grasses and alfalfa for pasture. It also is well suited to hardwoods, such as red and white oaks. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit VIe–1; woodland group 1; wildlife group 1.

Shiffer Series

The Shiffer series consists of nearly level to gently sloping, somewhat poorly drained soils. These soils are in depressions and drainageways on stream and river terraces. They formed in loamy sediment underlain by loose sand. The native vegetation was moist-land prairie grasses, tall shrubs, and a few elm and silver maple trees.

In a representative profile the surface layer is very dark grayish-brown loam about 9 inches thick. The subsoil is about 20 inches thick. It is dark-brown loam in the upper part, yellowish-brown loam in the middle part, and yellowish-brown loamy sand that has grayish-brown mottles in the lower part. It is underlain by very pale brown sand that has yellow mottles.

Permeability is moderate in the subsoil and rapid in the substratum, but percolation of water is slow where the water table is high during wet seasons. Available water capacity is moderate, and natural fertility is medium. Where these soils are in narrow drainageways, they are subject to frequent ponding.

Areas of these soils in narrow drainageways where outlets are partly blocked are used mainly for pasture and as wildlife habitat. Where adequately drained, the areas of these soils are used for row crops, mainly corn.

Representative profile of Shiffer loam, 0 to 3 percent slopes, in a pasture in NE¼SE¼ sec. 15, T. 24 N., R. 7 W.:

Ap—0 to 9 inches, very dark grayish-brown (10YR 3/2) loam; moderate, medium and fine, granular structure; very friable; strongly acid; abrupt, smooth boundary.

B2t—9 to 15 inches, dark-brown (10YR 4/3) loam; moderate, medium and fine, subangular blocky structure; few, thin, patchy clay films on ped faces; very friable; very strongly acid; gradual, smooth boundary.

B21t—15 to 26 inches, yellowish-brown (10YR 5/4) loam that has many, coarse, distinct, grayish-brown (10YR 5/2) mottles; moderate, coarse and medium, subangular blocky structure; few, thin, patchy clay films; very friable; very strongly acid; gradual, smooth boundary.

IIB3—26 to 29 inches, yellowish-brown (10YR 5/6) loamy sand that has many, coarse, prominent, grayish-brown (10YR 5/2) mottles; weak, coarse, subangular blocky structure that parts to single grain; very friable; very strongly acid; abrupt, smooth boundary.

IIC—29 to 60 inches, very pale brown (10YR 8/3) sand that has common, coarse, prominent, yellow (10YR 7/6) mottles; loose; single grain; very strongly acid.

The solum ranges from 20 to 36 inches in thickness. It is underlain by deep, loose sand that has bands of loamy sand, sandy loam, and loam in a few areas.

The Ap horizon is very dark grayish brown (10YR 3/2), dark brown (10YR 3/3), or very dark brown (10YR 2/2) and ranges from 6 to 10 inches in thickness. Generally, it is medium acid or strongly acid, but in limed areas it is neutral in reaction. The A horizon ranges from fine sandy loam to loam in texture. The Bt horizon ranges from loam to heavy loam.

Shiffer soils in Trempealeau County are less well developed in the Bt horizon than is typical for the Shiffer series.

Shiffer soils are adjacent to Meridian and Billett soils and to Kato soils, sandy loam variant. Shiffer soils are more poorly drained than Meridian soils. Shiffer soils are more poorly drained and have more silt than Billett soils. They have a thinner surface layer and have more silt than Kato soils, sandy loam variant.

Shiffer loam, 0 to 3 percent slopes (ShA).—This soil is in uniformly shaped areas in depressions and drainageways on stream and river terraces. Some areas have a surface layer of sandy loam.

Included with this soil in mapping are a few areas of soils that have loamy bands in the sandy substratum and a few areas of soils that are underlain by sandstone bedrock. Also included are a few small areas of well-drained Meridian and Billett soils on stream terraces.

Use of this soil is determined by its position on the landscape. In narrow drainageways this soil is more susceptible to ponding and has a higher water table than in areas in large depressions and large drainageways. Drainage by open ditches or shallow surface drains is often difficult because natural outlets are partly blocked.

Areas of this soil in narrow drainageways where outlets are partly blocked are used for pasture or as wildlife habitat. Where adequately drained, this soil is in crops, mainly corn. Capability unit IIw–5; woodland group 7; wildlife group 5a.

Sparta Series

The Sparta series consists of nearly level to sloping, excessively drained, sandy soils on stream and river terraces. These soils formed in deep sandy sediment. The native vegetation was bur oak savanna and dryland prairie grasses.

In a representative profile the surface layer is very dark grayish-brown loamy sand about 16 inches thick. The subsoil is brown loamy sand about 14 inches thick. It is underlain by brownish-yellow medium and coarse sand.

Permeability is rapid. Available water capacity and

natural fertility are low. The hazard of soil blowing is severe.

Most areas of these soils are in pasture or pine tree plantations. Some nearly level to gently sloping areas, however, are in soybeans and alfalfa.

Representative profile of Sparta loamy sand, 6 to 12 percent slopes, 250 yards south of U.S. Highway No. 10 in the NW¼SE¼ sec. 13, T. 24 N., R. 9 W.:

A—0 to 16 inches, very dark grayish-brown (10YR 3/2) loamy sand; weak, coarse, subangular blocky structure that parts to weak, fine, subangular blocky; very friable; common roots; strongly acid; gradual, wavy boundary.

B2—16 to 30 inches, brown (7.5YR 4/4) loamy sand; weak, coarse and medium, subangular blocky structure; very friable; strongly acid; gradual, wavy boundary.

C—30 to 60 inches, brownish-yellow (10YR 6/6) medium and coarse sand; single grained; loose; strongly acid.

The solum ranges from 16 to 34 inches in thickness. The A horizon ranges from 10 to 20 inches in thickness and is very dark grayish brown (10YR 3/2), very dark brown (10YR 2/2), or dark brown (10YR 3/3). Generally this horizon is strongly acid, but some limed areas are neutral in reaction. Sparta soils near the Mississippi River have more fine and very fine sand than other Sparta soils in the county.

Sparta soils are on sandy terraces adjacent to Gotham, Dickinson, Billett, and Meridian soils. Sparta soils have less silt and fine sand and more medium and coarse sand than Dickinson soils. They have a thicker A horizon and a B horizon that has more coarse sand and slightly less clay than Gotham soils. They have much more sand and less clay and silt than Billett and Meridian soils.

Sparta loamy sand, 0 to 2 percent slopes (SpA).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is thinner. Also, in most places the surface layer is darker. In areas near the Mississippi River, this soil has more fine and very fine sand.

Included with this soil in mapping are a few small areas of Gotham and Dickinson soils. Also included are a few areas of loamy sands that have a dark-colored surface layer that ranges from 20 to 36 inches in thickness.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe. In places irrigation is feasible on large areas of this soil.

Most areas of this soil are cultivated, but some large areas are in pine trees. This soil is suited to grasses, alfalfa, and pine tree plantations. In some areas, this soil is well suited to corn, lima beans, potatoes, and other specialty crops where irrigation is possible. Control of erosion and maintenance of fertility and organic-matter content are good management practices. Capability unit IVs–3; woodland group 4; wildlife group 3.

Sparta loamy sand, 2 to 6 percent slopes (SpB).—This soil is in irregularly shaped areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but the surface layer is slightly thinner. Also, in convex areas and in a few eroded areas, the surface layer is lighter in color. In areas near the Mississippi River, this soil contains more fine sand than in other areas.

Included with this soil in mapping are a few areas of loamy sands that have a dark surface layer 20 to 36 inches thick. Also included are a few small areas of Gotham and Dickinson soils and a few small areas of soils that are less sloping or more sloping than this Sparta soil.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe. In places, irrigation is feasible on large areas of this soil, mainly where slopes are 2 or 3 percent.

Most areas of this soil are cultivated, but some large areas are in pine trees. This soil is suited to grasses, alfalfa, and pine tree plantations. Where irrigation is feasible, some areas are well suited to lima beans, corn, potatoes, and other specialty crops. Control of erosion and maintenance of fertility and organic-matter content are good management practices. Capability unit IVs–3; woodland group 4; wildlife group 3.

Sparta loamy sand, 6 to 12 percent slopes (SpC).—This soil is in irregularly shaped areas on stream and river terraces. It has the profile described as representative for the series. Eroded areas and areas of this soil that have convex slopes have a thinner, lighter colored surface layer.

Included with this soil in mapping are areas of loamy sand soils that have a dark surface layer that ranges from 20 to 36 inches in thickness. Also included are a few small areas of Gotham soils and a few areas of soils that are less sloping or more sloping than this Sparta soil.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe, and the hazard of water erosion is moderate.

Most of this soil is in pasture or pine trees. This soil is suited to grasses and alfalfa for pasture and to pine tree plantations. Control of erosion and maintenance of fertility and organic-matter content are good management practices. Capability unit VIs–3; woodland group 4; wildlife group 3.

Sparta Series, Mottled Subsoil Variant

The Sparta series, mottled subsoil variant, consists of nearly level to gently sloping, moderately well drained and somewhat poorly drained soils on river terraces. These soils are mostly in depressions and on low terraces along the Buffalo and Mississippi Rivers. They formed in deep, sandy sediment. The native vegetation was bur oak savanna and prairie grasses.

In a representative profile the surface layer is about 19 inches thick. It is very dark grayish-brown loamy fine sand in the upper part and dark-brown loamy sand that has dark yellowish-brown mottles in the lower part. The subsoil is about 6 inches thick. It is dark yellowish-brown loamy sand that has a few dark-brown mottles. It is underlain by loose, light yellowish-brown and yellow coarse and medium sand that has dark-brown and brownish-yellow mottles.

Permeability is rapid, but percolation of water is moderately slow during wet seasons in areas where the water table is seasonally high. Available water capacity and natural fertility are low. The subsoil is strongly acid. The hazard of soil blowing is severe.

Some areas of this soil are in corn, oats, and hay. Also, some large areas, mainly near the Black River, are in pasture and woodland.

Representative profile of a Sparta loamy fine sand,

mottled subsoil variant, 0 to 3 percent slopes, in a pasture on a low terrace west of road in the SE¼SE¼ sec. 32, T. 18 N., R. 8 W.:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) loamy fine sand; weak, medium, granular structure; very friable; strongly acid; abrupt, smooth boundary.

A12—6 to 13 inches, very dark grayish-brown (10YR 3/2) loamy fine sand; weak, medium and fine, subangular blocky structure; very friable; strongly acid; clear, smooth boundary.

A13—13 to 19 inches, dark-brown (10YR 3/3 to 4/3) loamy sand that has few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, coarse, subangular blocky structure; very friable; strongly acid; clear, irregular boundary.

B2—19 to 25 inches, dark yellowish-brown (10YR 4/4) loamy sand that has few, fine, faint, dark-brown (7.5YR 3/4 to 4/4) mottles; weak, coarse and medium, subangular blocky structure; very friable; strongly acid; clear, smooth boundary.

C1—25 to 36 inches, light yellowish-brown (10YR 6/4) coarse and medium sand that has common, medium, prominent and distinct, dark-brown (7.5YR 3/4 to 4/4) and brownish-yellow (10YR 6/6) mottles; single grained; loose; strongly acid; clear, smooth boundary.

C2—36 to 60 inches, yellow (10YR 7/6) coarse and medium sand that has common, medium, faint, brownish-yellow (10YR 6/6) mottles; single grained; loose; strongly acid; clear, smooth boundary.

The solum ranges from 24 to 36 inches in thickness. Generally the Ap horizon is strongly acid, but it is slightly acid or neutral in limed areas. The A horizon ranges from black (10YR 2/1) to dark brown (10YR 3/3) and is loamy sand or loamy fine sand 10 to 20 inches thick. Faint, high-chroma mottles are present in the A13 horizon in some areas. The B and C horizons are dark yellowish brown (10YR 4/4) to yellow (10YR 7/6 to 8/6) and have high-chroma mottles.

Sparta soils, mottled subsoil variant, are adjacent to Morocco, Sparta, and Gotham soils. Sparta soils, mottled subsoil variant, have better drainage than Morocco soils and poorer drainage than Sparta and Gotham soils. They have more coarse and medium sand and less clay in the B horizon than is typical for Gotham soils.

Sparta loamy fine sand, mottled subsoil variant, 0 to 3 percent slopes (SrA).—This soil is in irregular areas on stream and river terraces. It has a profile similar to the one described as representative of the series, but a few areas in depressions have a darker surface level.

Included with this soil in mapping, especially near the Black River, are areas of Morocco soils and Wet alluvial land. Also included are a few small areas of Gotham and Sparta soils and a few small areas of soils that are more sloping than this Sparta soil, mottled subsoil variant.

Available water capacity and natural fertility are low. The water table is seasonally high. The hazard of soil blowing is severe, especially on large areas. Most areas are too small and irregular in shape for irrigation or other types of intensive management practices.

Most areas of this soil are suited to grasses, oats, and red clover. This soil also is suited to trees, such as white pine. Control of erosion and maintenance of fertility are good management practices. Supplemental drainage helps crop growth in wet seasons. Capability unit IVw–5; woodland group 8; wildlife group 5a.

Stony and Rocky Land

Stony and rocky land (St) consists of very steep areas and escarpments in areas of high limestone ridges (fig. 15). The most prominent are Oak and Arcadia Ridges in the southern part of the county. The native vegetation was hardwoods, mainly red and black oaks.

Stony and rocky land is about 20 percent exposed rock, 60 percent shallow soil, and 20 percent moderately deep and deep soils. Rock fragments and flagstones consist of chert, hard sandstone, and sandy dolomitic limestone. These fragments and flagstones range from hand size to several feet in length. The soils are mostly neutral to slightly alkaline in reaction. The soils vary but they consist mostly of somewhat excessively drained and well-drained soils that are shallow to large flagstones of bedrock.

The surface layer is very dark brown or very dark grayish-brown silt loam 1 to 4 inches thick. The subsoil is dark-brown to yellowish-brown sandy loam, loam, or silt loam 2 to 20 inches thick. It is underlain by sandstone, sandy limestone, and chert rock. A small amount of soil material is between the rocks and in rock fractures.

Included with this land type in mapping are small areas of excessively drained Boone and Eleva soils near sandstone outcrop; well-drained Palsgrove soils, clayey subsoil variant; and Gale, Hixton, Urne, La Farge, and Seaton soils. Also included are a few small areas of soils that have slopes of less than 30 percent.

Runoff is rapid, and the hazard of erosion is severe. Available water capacity is low in most places, but it is moderate to high in some silty areas in drainageways and at the base of steep slopes.

Most areas of stony and rocky land are wooded. This land type has potential for wildlife habitat and for black and bur oaks of medium to poor quality. The moderately deep and deep soils have potential for red and black oaks of medium to good quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Capability unit VIIs–6; woodland group 13; wildlife group 8.

Trempe Series

The Trempe series consists of nearly level to gently sloping, excessively drained soils or low terraces along the larger streams and rivers in the county. The soils formed in reddish-colored, sandy sediment. The native vegetation was oak savanna.

In a representative profile the surface layer is dark reddish-brown loamy sand about 18 inches thick. The subsoil is dark reddish-brown loamy sand about 5 inches thick. It is underlain by deep, loose, dark reddish-brown and yellowish-red sand.

Permeability is rapid. Available water capacity and natural fertility are low. The subsoil is strongly acid.

Most areas of these soils are in grasses and alfalfa. Small irrigated areas are used for strawberries, sweet corn, cucumbers, and other garden crops.

Representative profile of Trempe loamy sand, 0 to 2 percent slopes, on a low terrace in NW¼NE¼ sec. 14, T. 24 N., R. 7 W.:

A1—0 to 18 inches, dark reddish-brown (5YR 3/2) loamy sand; weak, fine, subangular blocky structure; very friable; many fibrous roots; strongly acid; clear, wavy boundary.

B2—18 to 23 inches, dark reddish-brown (2.5YR 3/4) loamy sand; weak, medium, subangular blocky structure;

Figure 15.—Area of Stony and rocky land along Oak Ridge.

very friable; few fibrous roots; strongly acid; clear, wavy boundary.

C1—23 to 29 inches, dark reddish-brown (2.5YR 3/4) fine sand; loose; single grained; strongly acid; gradual, smooth boundary.

C2—29 to 60 inches, yellowish-red (5YR 5/6) medium sand; loose; few iron concretions about 1 inch in diameter; single grained; strongly acid.

The A horizon ranges from dark reddish brown to dark brown. It has a hue of 7.5YR to 5YR and a value and chroma of 2 or 3. The A horizon is sand, loamy sand, or loamy fine sand that ranges from 10 to 20 inches in thickness. The B horizon is lighter colored than the A horizon, and it has a hue of 7.5YR or 2.5YR and a chroma and value of 3 or 4. The lower part of the C horizon has reduced iron, and the color is more varied. It has a hue of 10YR, 7.5YR, or 5YR, a value of 4 to 6, and a chroma of 4 to 8.

Trempe soils are adjacent to Trempealeau and Dunnville soils and Sandy terrace escarpments. They have less silt and clay than Trempealeau and Dunnville soils. They also lack the Bt horizon of Trempealeau soils. Trempe soils have a thicker A horizon and are more nearly level than Sandy terrace escarpments.

Trempe loamy sand, 0 to 2 percent slopes (TrA).—This soil is in irregularly shaped areas on low stream and river terraces. It has the profile described as representative of the series. In some cultivated areas this soil is lighter colored.

Included with this soil in mapping are a few small areas of Trempealeau and Dunnville soils and Sandy terrace escarpments. Also included are a few small areas of soils that are less sloping or more sloping than this Trempe soil.

Available water capacity and natural fertility are low. The hazard of soil blowing is severe.

Most areas of this soil are too small for extensive irrigation, but in areas where small irrigation systems are used, this soil is well suited to such garden crops as sweet corn, strawberries, and cucumbers. Areas of this soil also are suited to grasses and legumes for hay and pasture. Control of erosion and maintenance of organic-matter content and fertility are good management practices. Capability unit IVs–3; woodland group 4; wildlife group 3.

Trempe loamy sand, 2 to 6 percent slopes (TrB).—This soil is in irregularly shaped areas on low stream and river terraces. It has a profile similar to the one described as representative of the series, but it has more knolls where the surface layer is lighter colored.

Included with this soil in mapping are a few small areas of Trempealeau and Dunnville soils and Sandy terrace escarpments. Also included are a few small areas of soils that are less or more sloping than this Trempe soil.

Available water capacity and natural fertility are

low. The hazard of soil blowing is severe. Most areas of this soil are too small for extensive irrigation.

This soil is suited to grasses and alfalfa. A few areas that have slopes of 2 to 3 percent are well suited to garden vegetables if they are irrigated. Control of erosion and maintenance of organic-matter content and fertility are good management practices. Capability unit IVs–3; woodland group 4; wildlife group 3.

Trempealeau Series

The Trempealeau series consists of nearly level to gently sloping, well-drained soils on low terraces along the larger streams and rivers. These soils formed in reddish-colored, loamy sediment that is underlain by loose sand. The native vegetation was oak savanna.

In a representative profile the surface layer is dark reddish-brown loam about 11 inches thick. The subsoil is about 14 inches thick and has small concretions of iron. It is dark reddish-brown loam in the upper part and dark-red sandy loam in the lower part. It is underlain by dark-red to pink fine and medium sand.

Permeability is moderate in the upper part of the subsoil and rapid in the lower part. Available water capacity is moderate and natural fertility is medium. The subsoil is strongly acid.

Most areas of these soils are in corn.

Representative profile of Trempealeau loam, 0 to 3 percent slopes, 100 yards south of U.S. Highway 10 in SE¼SW¼ sec. 12, T. 24 N., R. 8 W.:

Ap—0 to 7 inches, dark reddish-brown (5YR 2/2) loam; weak, medium, subangular blocky structure that parts under pressure to weak, fine, subangular blocky; friable; many, fine, fibrous roots; neutral; abrupt, smooth boundary.

A3—7 to 11 inches, dark reddish-brown (5YR 3/2) loam; weak, fine, subangular blocky structure; friable; many, fine, fibrous roots; slightly acid; clear, wavy boundary.

B2t—11 to 20 inches, dark reddish-brown (2.5YR 3/3) heavy loam; moderate, medium, subangular blocky structure; friable; few to common, fine, fibrous roots; clay bridging; few small iron concretions; strongly acid; clear, wavy boundary.

B3—20 to 25 inches, dark-red (2.5YR 3/6) light sandy loam; weak and moderate, medium, subangular blocky structure; friable; few small iron concretions; strongly acid; gradual, wavy boundary.

IIC1—25 to 32 inches, dark-red (2.5YR 5/6) sandy loam; very weakly cemented with iron; strongly acid; clear, smooth boundary.

IIC2—32 to 60 inches, pink (7.5YR 8/4) medium sand; single grained; loose; medium acid.

The solum ranges from 20 to 30 inches in thickness. The A horizon ranges from dark reddish brown to dark brown. It has hues of 10YR, 7.5YR, and 5YR and a value and chroma of 2 to 3. The A horizon ranges from 10 to 15 inches in thickness. Generally, it is medium acid or strongly acid, but it is neutral or slightly acid in limed fields. The Bt horizon is heavy loam or loam that has a hue of 7.5YR, 5YR, or 2.5YR, a value of 3, 4, or 5, and a chroma of 3 to 8. Reddish-colored concretions of iron commonly are throughout the B horizon and the upper part of the C horizon. The lower part of the C horizon has some reduced iron, and the color is more varied. It has hues of 10YR, 7.5YR, and 5YR, a value of 4 to 6, and a chroma of 4 to 8.

Trempealeau soils are adjacent to Whitehall, Dunnville, Sparta, and Gotham soils and Trempealeau soils, mottled subsoil variant. Trempealeau soils lack the silt mantle that is characteristic of Whitehall soils. They have more silt and clay than Dunnville soils, and they have a Bt horizon, which Dunnville soils lack. They have better drainage and a deeper water table than Trempealeau soils, mottled subsoil variant. They have a reddish-colored B horizon and have less sand and more silt and clay than Gotham and Sparta soils.

Trempealeau loam, 0 to 3 percent slopes (TuA).—These soils are in irregularly shaped areas on low stream and river terraces.

Included with this soil in mapping are some areas of eroded soils that have a lighter colored surface layer and some areas in drainageways of soils that have a darker surface layer than this Trempealeau soil. Also included are a few small areas of Trempealeau soils, mottled subsoil variant; Whitehall and Dunnville soils; and Sandy terrace escarpments. Also included are a few areas of soils that are more sloping than this Trempealeau soil.

Available water capacity and natural fertility are medium. The hazard of erosion is slight in the gently sloping area.

This soil is suited to corn, oats, and alfalfa. It commonly is used for corn. Control of erosion and maintenance of tilth, structure, and organic-matter content are good management practices, especially where corn is grown year after year. Capability unit IIs–1; woodland group 12; wildlife group 4.

Trempealeau Series, Mottled Subsoil Variant

The Trempealeau series, mottled subsoil variant, consists of nearly level to gently sloping, moderately well drained to somewhat poorly drained soils on low stream and river terraces. These soils formed in reddish-colored, loamy sediment that is underlain by loose sand. The native vegetation was moist-land prairie grasses, tall shrubs, and a few trees, such as silver maple, elm, and oak.

In a representative profile the surface layer is black loam about 12 inches thick. The subsoil is about 20 inches thick. It is dark reddish-brown loam that has many concretions of iron in the upper part, dark-brown sandy loam that has concretions of iron in the middle part, and brown loamy sand that has concretions of iron, reddish-brown mottles, and loamy bands that have dark grayish-brown mottles in the lower part. It is underlain by reddish-yellow fine and medium sand that has many red mottles.

Permeability is moderate in the upper part of the subsoil and rapid in the lower part, but water percolation is slow in areas where the water table is high in wet seasons. Available water capacity is moderate, and natural fertility is medium. The subsoil is medium acid to strongly acid. During wet seasons, mainly early in spring, these soils are wet and have a seasonal high water table in areas where water is concentrated by runoff and stream overflow.

Most areas of this soil are in corn, oats, and hay. A few areas are in pasture.

Representative profile of Trempealeau loam, mottled subsoil variant, 0 to 3 percent slopes, about 80 yards east of a culvert under State Highway No. 10 in NE¼SW¼ sec. 17, T. 24 N., R. 8 W.:

Ap—0 to 8 inches, black (10YR 2/1) loam; moderate, medium, subangular blocky structure; friable; neutral; clear, smooth boundary.

A12—8 to 12 inches, black (10YR 2/1) loam; moderate, coarse, subangular blocky structure; friable; neutral; clear, smooth boundary.

B21tcn—12 to 16 inches, dark reddish-brown (5YR 3/3) light loam that has many, medium and coarse, very dusky red (2.5YR 2/2) iron concretions; weak, very fine, subangular blocky structure; thin, patchy clay films; friable; medium acid; gradual, smooth boundary.

B22cn—16 to 27 inches, dark-brown (7.5YR 4/4) sandy loam that has common, medium and coarse, very dusky red (2.5YR 2/2) iron concretions; weak, fine and medium, subangular blocky structure; friable; strongly acid; gradual, wavy boundary.

B3—27 to 32 inches, brown (7.5YR 4/4) loamy sand that has very dusky red (2.5YR 2/2) iron concretions and nodules; common, medium, dark reddish-brown (2.5YR 3/4) mottles, and loamy bands that have few, fine, faint, dark grayish-brown (10YR 4/2) mottles; weak, medium, subangular blocky structure; very friable; strongly acid; gradual, smooth boundary.

C1—32 to 60 inches, reddish-yellow (7.5YR 6/6) fine and medium sand that has many, fine, distinct, red (2.5YR 5/6) mottles; medium acid.

The solum ranges from 20 to 34 inches in thickness. The loose, sandy substratum has reduced iron and a few loamy bands.

The A horizon is loam or silt loam. Some areas of this soil have a silt mantle. The A horizon ranges from black to very dark brown or dark reddish brown in color and from 8 to 16 inches in thickness. It has a hue of 10YR, 7.5YR, or 5YR, a value of 2 or 3, and a chroma of 1 or 2. Generally, the A horizon is slightly acid or medium acid, but it is neutral in limed areas. The Bt horizon is dark-brown, reddish-brown, or dark reddish-brown loam or light loam. It has a hue of 7.5YR or 5YR, a value of 3 or 4, and a chroma of 3 or 4. The B horizon has reddish-colored concretions of iron. Many high-chroma mottles and a few low-chroma mottles are in the lower part of the B horizon and the upper part of the C horizon.

Trempealeau soils, mottled subsoil variant, are adjacent to Whitehall, Trempealeau, and Dunnville soils. They are more poorly drained and have a larger number of concretions of iron than Trempealeau soils. They are more poorly drained and have a larger number of concretions of iron than Whitehall soils, and they do not have the mantle of silt that is typical of Whitehall soils. They are more poorly drained and have more silt, clay, and concretions of iron and less sand than Dunnville soils.

Trempealeau loam, mottled subsoil variant, 0 to 3 percent slopes (TvA).—This soil is in irregularly shaped areas on low stream and river terraces.

Included with this soil in mapping are some areas of eroded soils that have a lighter colored surface layer than this soil and a few small areas of Whitehall and Trempealeau soils. Also included are a few areas of Trempealeau soils, mottled subsoil variant, that have a surface layer of silt loam, and a few small areas of soils that are less sloping or more sloping than this Trempealeau soil, mottled subsoil variant.

In areas where the water table is raised by runoff and stream overflow, these soils are wet early in spring and tillage is delayed. Available water capacity is moderate, and natural fertility is medium. The hazard of erosion caused by stream overflow is slight to moderate.

If this soil is protected from stream overflow, it is suited to corn. Control of erosion caused by stream overflow and maintenance of adequate drainage, tilth, and organic-matter content are good management practices. Capability unit IIw–5; woodland group 12; wildlife group 5a.

Urne Series

The Urne series consists of gently sloping to very steep, well-drained soils on shaly sandstone uplands. Most areas of these soils are on ridgetops and side slopes throughout the county. They formed mainly in loamy, glauconitic sandstone residuum that is underlain by soft, shaly sandstone. Some areas of these soils have a thin mantle of silt. The native vegetation was hardwoods, mainly red and black oaks.

In a representative profile the plow layer is dark-brown silt loam about 6 inches thick. The subsoil is about 18 inches thick. It is brown silt loam in the upper part and olive-brown very fine sandy loam in the lower part. Beneath the subsoil is yellowish-brown very fine sandy loam that is underlain by soft, shaly, olive-brown sandstone.

Permeability is moderate. Available water capacity is low. Natural fertility is medium. The subsoil ranges from very slightly acid to medium acid. Potassium is available for plant growth in areas where glauconite is present in the subsoil and substratum of these soils. The very fine sand in the subsoil and substratum is unstable when wet.

Most areas of these soils are moderately steep to very steep and are in pasture or woodland. Nearly level to sloping areas are used for corn, oats, and alfalfa.

Representative profile of Urne silt loam, 6 to 12 percent slopes, eroded, in alfalfa-brome field on a narrow ridgetop, 100 yards northwest of the center of the SW¼SW¼ sec. 22, T. 22 N., R. 7 W.:

Ap—0 to 6 inches, dark-brown (10YR 4/3) silt loam; moderate, fine, granular structure; very friable; neutral; abrupt, smooth boundary.

B1—6 to 12 inches, brown (7.5YR 4/4) silt loam; moderate, fine, subangular blocky structure; friable; medium acid; clear, irregular boundary.

IIB2—12 to 24 inches, olive-brown (2.5Y 4/4) very fine sandy loam; moderate, medium, subangular blocky structure; very friable; slightly acid; abrupt, smooth boundary.

IIC—24 to 30 inches, yellowish-brown (10YR 5/4) very fine sandy loam that has light olive-brown (2.5Y 5/4) and grayish-green (5G 4/2) sand grains; massive; slightly acid; clear, smooth boundary.

R—30 to 60 inches, soft, olive-brown (2.5Y 4/4), glauconitic, shaly sandstone bedrock; neutral.

The solum ranges from 20 to 30 inches in thickness. Where the mantle of silt occurs, it ranges from 6 to 20 inches in thickness. Content of glauconite in the sandstone residuum varies. In areas that have small amounts of glauconite, the residuum ranges from loamy very fine sand to very fine sandy loam. In areas that have thick bands of glauconite, the residuum is sandy loam or loam.

The Ap horizon is dark brown (10YR 3/3 to 4/3) or dark grayish brown (10YR 2/2). Where present, the A1 horizon is very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2), or very dark gray (10YR 3/1) and is 1 to 4 inches thick. The A horizon is very fine sandy loam, fine sandy loam, or silt loam.

Urne soils are neutral to medium acid in the upper and middle parts and slightly acid to mildly alkaline in the lower part and in the C horizon.

Urne soils are adjacent to Norden, Eleva, and Gale soils and Gale soils, shallow phase. Urne soils lack the Bt horizon of Norden soils. Urne soils are underlain by less acid, coarse-grained sandstone than Eleva and Gale soils and Gale soils, shallow phase.

Urne fine sandy loam, 2 to 6 percent slopes (UfB).—This soil is in irregularly shaped areas on narrow ridgetops. It has a profile similar to the one described as representative of the series, but the upper part of

the profile has more sand and less silt. Also, the surface layer is slightly thicker and darker.

Included with this soil in mapping are a few areas of eroded Urne soils and a few small areas of Eleva, Norden, and Gale soils and Gale soils, shallow phase. Also included are a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is slight.

This soil is suited to oats, alfalfa, and corn. Control of erosion is a good management practice. Capability unit IIe–2; woodland group 3; wildlife group 3.

Urne fine sandy loam, 6 to 12 percent slopes, eroded (UfC2).—This soil is in irregularly shaped areas on narrow ridgetops. It has a profile similar to the one described as representative of the series, but the upper part of the profile has more sand and less silt. In most areas where this soil has been cultivated, part of the material from the subsoil is mixed with that in the plow layer.

Included with this soil in mapping are a few areas of uneroded Urne soils, a few areas of soils that have a thick, dark-colored surface layer, and a few small areas of Norden, Eleva, and Gale soils and Gale soils, shallow phase. Also included are small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is moderate. In most areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to grass, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IIIe–2; woodland group 3; wildlife group 3.

Urne fine sandy loam, 12 to 20 percent slopes, eroded (UfD2).—This soil is in irregularly shaped areas on the sides of ridges. It has a profile similar to the one described as representative of the series, but the upper part of the profile has more sand and less silt. In most areas where this soil has been cultivated, part of the material from the subsoil and a few sandstone flags are mixed into the plow layer.

Included with this soil in mapping are a few areas of uneroded Urne soils, a few areas of soils that have a dark surface layer, and a few small areas of Norden, Eleva, and Gale soils and Gale soils, shallow phase. Also included are a few small areas of soils that have bedrock at a depth of less than 20 inches and a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion in most areas. The sandstone residuum is unstable where it is wet. A few small gullies form in areas along drainageways if this soil is cultivated intensively.

This soil is suited to grasses and alfalfa for pasture and hay. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–2; woodland group 3; wildlife group 3.

Urne fine sandy loam, 20 to 30 percent slopes, eroded (UfE2).—This soil is in irregularly shaped areas on the sides of ridges. It has a profile similar to the one described as representative of the series, but it has more sand and less silt in the upper part of the profile. In some eroded areas, the subsoil is exposed and a few sandstone flags are on the surface.

Included with this soil in mapping are a few areas of uneroded Urne soils, a few areas of soils that have a thick, dark-colored surface layer, and a few small areas of Eleva and Gale soils and Gale soils, shallow phase. Also included are a few small areas of soils that have bedrock at a depth of less than 20 inches and a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion. The sandstone residuum is unstable in wet areas. Small gullies form in areas along drainageways if this soil is heavily pastured or disturbed.

This soil has good potential for forage and timber crops. It is suited to grasses for pasture and to red or white pines of good quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit VIe–2; woodland group 3; wildlife group 3.

Urne fine sandy loam, 30 to 45 percent slopes (UfF).—This soil is in irregularly shaped areas on the sides of ridges. It has a profile similar to the one described as representative of the series, but the upper part has more sand and less silt. Also, most of the areas of this soil are wooded, and the surface layer in these areas is thinner and darker in color.

Included with this soil in mapping are a few areas of eroded Urne soils and a few areas of soils that have a thick, dark-colored surface layer. Also included are a few areas of Eleva and Norden soils and Gale soils, shallow phase; a few small areas of soils that have bedrock at a depth of less than 20 inches; and a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is very severe. Gullies form in areas along drainageways if this soil is disturbed.

Most of this soil is in woodland. This soil is suited to red and white pines of good quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion is a good management practice. Capability unit VIIe–2; woodland group 3; wildlife group 3.

Urne silt loam, 6 to 12 percent slopes, eroded (UnC2).—This soil is in irregularly shaped areas on narrow ridgetops. It has the profile described as representative for the series. In most areas where this soil is cultivated, material from the subsoil and a few sandstone flags are mixed into the plow layer.

Included with this soil in mapping are a few areas of uneroded Urne soils and a few small areas of

Norden soils and Gale soils, shallow phase. Also included are a few small areas of soils where depth to bedrock is less than 20 inches and a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is moderate. The tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to grass, alfalfa, and a limited amount of corn. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IIIe–2; woodland group 3; wildlife group 3.

Urne silt loam, 12 to 20 percent slopes, eroded (UnD2).—This soil is in irregularly shaped areas on the sides of ridges. It has a profile similar to the one described as representative of the series, but in most places it has a thinner silt mantle. In most areas where this soil is cultivated, material from the subsoil and a few sandstone flags are mixed into the plow layer.

Included with this soil in mapping are a few areas of uneroded Urne soils and a few small areas of Norden soils and Gale soils, shallow phase. Also included are a few small areas of soils where depth to bedrock is less than 20 inches and a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is severe. The tilth and organic-matter content of the surface layer have been adversely affected by erosion. The sandstone residuum is unstable where it is wet. A few small gullies form in areas along drainageways if this soil is cultivated intensively.

This soil is suited to grasses and alfalfa for hay or pasture. It also is well suited to red and white pines of good quality. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–2; woodland group 3; wildlife group 3.

Urne silt loam, 20 to 30 percent slopes, eroded (UnE2).—This soil is in irregularly shaped areas on the sides of ridges. It has the profile described as representative of the series, but in most places it has a thinner surface layer and the depth to bedrock is less. In some areas erosion has exposed the subsoil, and a few sandstone flags are on the surface.

Included with this soil in mapping are a few areas of uneroded Urne soils and a few small areas of Norden soils and Gale soils, shallow phase. Also included are a few small areas of soils where the depth to bedrock is less than 20 inches and a few small areas of soils that are less sloping or more sloping than this Urne soil.

Available water capacity is low. Natural fertility is medium. The hazard of erosion is severe. In some areas the tilth and organic-matter content of the surface layer have been adversely affected by erosion.

This soil is suited to grasses for pasture. It also is well suited to red and white pines of good quality and black and red oaks of medium quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit VIe–2; woodland group 3; wildlife group 3.

Urne-Norden complex, 12 to 20 percent slopes, eroded (UrD2).—The soils in this complex are in areas on soft, shaly sandstone uplands throughout the county. Generally, the sandstone is between the valley bottom and the high limestone ridges. The moderately deep soils of this complex formed in very fine sandy loam, fine sandy loam, and loam residuum. In many areas there is a shallow to moderately deep mantle of silt. Urne soils are in convex areas on side slopes, knobs, or knolls. Norden soils are in areas on ridgetops or in concave areas on side slopes (fig. 16). These soils are so intermingled and the areas are so small that it is impractical to map them separately. Urne soils make up about 50 percent of the acreage, and Norden soils about 50 percent. The native vegetation was hardwoods, mainly red and black oaks.

The Urne soils have a profile similar to the one described as representative of the series, but the surface layer is dark-brown very fine sandy loam, fine sandy loam, loam, or silt loam, and the subsoil is dark yellowish brown and in a few places has a few small sandstone fragments. Norden soils have a profile similar to the one described as representative of the Norden series, but the surface layer is fine sandy loam, loam, or silt loam, and in some areas the subsoil is brown.

Included with this complex in mapping are a few small areas of La Farge and Seaton soils near drainageways or in concave areas on side slopes and a few small areas of Eleva, Hixton, and Gale soils in convex areas. Also included are a few small areas of soils that have slopes of less than 12 percent or more than 20 percent.

The hazard of erosion is severe on these soils. The sandstone residuum is unstable where it is wet. Small gullies form if these soils are cultivated intensively.

The soils in this complex are mostly in pasture and crops. These soils have good potential for hay and timber crops. They are well suited to alfalfa-brome hay and to red and white pines of good quality and red and black oaks of medium to good quality. Control of erosion and maintenance of tilth and organic-matter content are good management practices. Capability unit IVe–2; woodland group 1; wildlife group 1.

Urne-Norden complex, 20 to 30 percent slopes (UrE).—The soils in this complex are in areas on soft, shaly, sandstone uplands throughout the county. Generally, the sandstone is between the valley bottom and the high limestone ridges. The moderately deep soils of this complex formed in very fine sandy loam, fine sandy loam, and loam residuum. In many areas of the complex there is a shallow or moderately deep mantle of silt. Urne soils are in convex areas on slope breaks and knobs. Norden soils are on narrow ridgetops and in concave areas on side slopes. These soils are so intermingled and the areas so small that it is impractical to map them separately. Urne soils make up slightly more than 50 percent of the acreage, and Norden soils make up slightly less than 50 percent. The native vegetation was hardwoods, mainly red and black oaks.

The Urne soils have a profile similar to the one described as representative for the Urne series, but the

Figure 16.—Area of Urne-Norden soils on narrow ridgetops.

surface layer in most areas is very dark grayish-brown very fine sandy loam, fine sandy loam, or silt loam 1 to 4 inches thick, and in many areas the subsoil contains less sand and more clay. Norden soils have a profile similar to the one described as representative for the Norden series, but the surface layer is very dark grayish-brown silt loam or loam and the subsoil in many areas contains more clay and less sand.

Included with this complex in mapping are a few small areas of Eleva soils near convex slope breaks, and areas of La Farge, Seaton, Fayette, and Huntsville soils near drainageways and in concave areas on side slopes. Also included are a few small areas of soils that have slopes of less than 20 percent or more than 30 percent.

The sandstone residuum is unstable when wet. Runoff is rapid on these soils, and the hazard of erosion, especially gully erosion, is severe in areas where these soils are disturbed.

Most areas of the soils of this complex are in pasture or woodland. They are well suited to pasture. Applications of lime and fertilizer help to increase growth of pasture crops. The soils are also suited to red and white pines of good quality and red and black oaks of medium to good quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. Control of erosion is a good management practice. The soft, shaly sandstone is used for road fill. Capability unit VIe–2; woodland group 1; wildlife group 1.

Urne-Norden complex, 30 to 45 percent slopes (UrF).—The soils in this complex are in areas on soft, shaly, sandstone uplands throughout the county. Generally, the sandstone is intermediate between the valley bottom and the high limestone ridges. The moderately deep soils of this complex formed in very fine sandy loam and loam residuum. In many areas of the complex there is a shallow to moderately deep mantle of silt. Urne soils are in convex areas on side slopes and knobs. Norden soils are on ridgetops and in concave areas on side slopes. These soils are so intermingled and the areas so small that it is impractical to map them separately. Urne soils make up about 65 percent of the acreage, and Norden soils 35 percent. The native vegetation was hardwoods, mainly red and black oaks.

The Urne soils have a profile similar to the one described as representative for the Urne series, but the surface layer in most areas is very dark grayish-brown very fine sandy loam, fine sandy loam, loam, or silt loam 1 to 4 inches thick, and in many areas the subsoil contains less sand and more clay. Norden soils have a profile similar to the one described as representative for the Norden series, but the surface layer in most areas is very dark grayish-brown silt loam or

loam 1 to 4 inches thick and in many areas the subsoil has more clay and less sand.

Included with this complex in mapping are a few small areas of Eleva soils near convex slope breaks and areas of La Farge, Seaton, Fayette, and Huntsville soils near drainageways and in concave areas on side slopes. Also included are a few small areas of soils that have slopes of less than 30 percent or more than 45 percent.

Runoff is very rapid on these soils, and the hazard of erosion, especially gully erosion, is severe in areas where these soils are disturbed.

Most areas of the soils of this complex are woodland. These soils are well suited to wildlife habitat. They are also suited to red and white pines of good quality and red and black oaks of medium to good quality. Trees do not grow so well in areas where slopes face south and southwest as they do in areas where slopes face in other directions. The soft, shaly sandstone is used as road fill. Capability unit VIIe–2; woodland group 1; wildlife group 1.

Wallkill Series

The Wallkill series consists of nearly level to gently sloping, poorly drained soils on valley bottoms. These soils formed in recent, weakly stratified alluvium underlain by deposits of muck or peaty muck. The native vegetation was wetland prairie grasses, sedges, and tall shrubs.

In a representative profile the surface layer is very dark grayish-brown silt loam about 2 inches thick. The subsoil is about 22 inches thick. The upper part of the subsoil is dark-gray silt loam that has some reddish-brown mottles, and the lower part is very dark gray to dark grayish-brown silt loam that has many dark yellowish-brown mottles and iron concretions. It is underlain by black muck.

Permeability is moderate, but percolation of water is slow in areas where the water table is high. Tile drains and open ditches help to drain wet areas. Natural fertility is medium. Available water capacity is very high. The muck substratum in Wallkill soils has high compressibility.

Most areas of these soils are in pasture. When adequately drained, these soils are suited to corn.

Representative profile of Wallkill silt loam, 0 to 3 percent slopes, in a pasture of bluegrass on a high valley bottom along a tributary of Traverse Creek, 100 yards from a town road in SW¼NW¼ sec. 19, T. 22 N., R. 9 W.:

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; mildly alkaline; clear, wavy boundary.

C1g—2 to 15 inches, dark-gray (10YR 4/1) silt loam that has common, medium, prominent, reddish-brown (5YR 4/4) mottles; massive structure that parts to weak, fine, platy; many brown (10YR 5/3) silt particles on some ped faces; very friable; mildly alkaline; clear, smooth boundary.

C2g—15 to 24 inches, very dark gray to dark grayish-brown (10YR 3/1 to 4/2) silt loam that has many, medium, distinct, dark yellowish-brown (10YR 4/6) mottles; massive structure that parts to weak, fine, platy; many gray (10YR 5/1) silt particles on ped faces; many, fine, dark yellowish-brown (10YR 4/6) iron concretions; friable; mildly alkaline; abrupt, smooth boundary.

IIC3—24 to 60 inches; black (10YR 2/1) sapric material that has many fine, herbaceous fibers; massive; friable; 40 percent fiber content, less than 10 percent when rubbed; massive; mildly alkaline.

The A1 horizon is very dark brown (10YR 2/2), very dark grayish-brown (10YR 3/2), or dark grayish-brown (10YR 4/2) silt loam that ranges from 1 to 4 inches in thickness. It ranges from slightly acid to slightly alkaline. The Cg horizon is dark grayish-brown (10YR 4/2), very dark gray (10YR 3/1), or dark-gray (10YR 4/1) silt loam that ranges from slightly acid to slightly alkaline. The silty alluvium ranges from 20 to 40 inches in thickness and is underlain by black (10YR 2/1) or very dark brown (10YR 2/2) muck or mucky peat.

Wallkill soils in Trempealeau County are higher in content of silt and lower in content of sand than is typical for the series.

Wallkill soils are adjacent to areas of Wet alluvial land and to Ettrick, Lawson, and Houghton soils. They have silty alluvium underlain by muck, and Wet alluvial land does not. Wallkill soils do not have the deep silt alluvium that Ettrick and Lawson soils have. They formed partly in silty alluvium, and Houghton soils typically formed entirely in deep organic material.

Wallkill silt loam, 0 to 3 percent slopes (WaA).—This soil is in uniformly shaped areas on valley bottoms.

Included with this soil in mapping are a few areas of soils that have darker colored alluvium than this soil and a few areas of soils that have lighter colored, recent alluvium. Also included are a few small areas of Wet alluvial land and of Lawson, Ettrick, and Houghton soils and a few small areas of soils that have slopes of more than 3 percent.

This soil has a seasonal high water table. Some areas are also subject to stream overflow. The hazard of erosion, especially streambank erosion, is severe.

Most areas of this soil are in pasture. This soil is well suited to corn where it is adequately drained. Control of erosion and protection from stream overflow are good management practices. Capability unit IIw–13; woodland group 9; wildlife group 5b.

Wet Alluvial Land

Wet alluvial land (We) is in nearly level, uniformly shaped areas on the bottom lands of rivers and streams throughout the county. It consists of light-colored and dark-colored, stratified sediment deposited by floodwater. It varies in texture, drainage, and reaction, but it is mainly poorly drained sandy loam, loam, and silt loam that is slightly acid to mildly alkaline. This sediment is underlain at a depth of 4 to 10 feet by loose sand.

Included with this land type in mapping are small areas of moderately well drained Sparta soils, somewhat poorly drained Morocco and Lawson soils, poorly drained Ettrick, Houghton, and Palms soils, and Marsh. A typical area of Wet alluvial land is in the Black River bottoms of Caledonia Township.

Permeability is moderate, but percolation of water is slow where the water table is high. Depth to the seasonally high water table is 0 to 4 feet. Most areas are subject to flooding during wet seasons. Runoff is slow.

Most areas are in trees, brush, or marsh vegetation. This land type is well suited to wildlife habitat. In a few small areas where flooding is less frequent, this land type is in pasture or crops. Capability unit Vw–14; woodland group 9; wildlife group 5b.

Whitehall Series

The Whitehall series consists of nearly level to gently sloping, well drained and moderately well drained soils on low stream and river terraces. These soils formed in reddish, silty sediment underlain by loose sand. The native vegetation was oak savanna.

In a representative profile the surface layer is very dark grayish-brown and black silt loam about 12 inches thick. The subsoil is about 24 inches thick. The upper part of the subsoil is dark-brown silty clay loam that has some soft, fine, yellowish-red iron concretions; the middle part is reddish-brown and pale-brown silt loam that has many soft iron concretions; and the lower part is brown loam that has many yellowish-brown mottles and dark reddish-brown iron concretions. It is underlain by loose, brown and pink sand that contains many hard, dark reddish-brown iron concretions.

Permeability is moderate. Available water capacity is moderate, and natural fertility is medium.

Most areas of these soils are in corn.

Representative profile of Whitehall silt loam, 0 to 3 percent slopes, on a low terrace in Eleva village park in the NW¼NW¼ sec. 10, T. 24 N., R. 9 W.:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine and medium, granular structure; very friable; neutral; abrupt, smooth boundary.

A12—6 to 12 inches, black (10YR 2/1) silt loam; weak, medium, granular and subangular blocky structure; friable; neutral; clear, wavy boundary.

B21t—12 to 20 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; common, thin, dark-brown (7.5YR 4/3) clay films on all ped faces; common, soft, fine, yellowish-red (5YR 4/8) iron concretions; medium acid; clear, smooth boundary.

B22t—20 to 28 inches, reddish-brown (5YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; moderately firm; thin, nearly continuous clay films on ped faces; many, fine and medium, dark reddish-brown (2.5YR 3/4) and dark-red (2.5YR 3/6) iron concretions; strongly acid; clear, smooth boundary.

B31—28 to 32 inches, pale-brown (10YR 6/3) silt loam; moderate, medium, subangular blocky structure; friable; common, soft, fine yellowish-red (5YR 4/8) iron concretions; very strongly acid; clear, smooth boundary.

IIB32—32 to 36 inches, brown (10YR 5/3) loam; weak, medium, subangular blocky structure; friable; many, medium, soft, dark reddish-brown (5YR 3/4) iron concretions and common, medium, distinct, yellowish-brown (10YR 5/8) mottles; very strongly acid; abrupt, smooth boundary.

IIC—36 to 60 inches, strong-brown (7.5YR 5/6) and pink (7.5YR 7/4) sand; single grained; loose; many, medium and fine, soft and hard, dark reddish-brown (5YR 3/4) iron concretions; very strongly acid.

The solum ranges from 34 to 40 inches in thickness. Thickness of the silty sediment ranges from 20 to 40 inches. The loose sandy substratum contains reduced iron and a few, thin, loamy bands.

The A1 horizon is black (10YR 2/1), very dark grayish brown (10YR 3/2), or dark reddish brown (5YR 2/2) and is 10 to 18 inches thick. It is generally medium acid or slightly acid, but in places reaction is neutral in limed areas. The Bt horizon is heavy silt loam or silty clay loam that has a hue of 7.5YR, 5YR, or 2.5YR, a value of 4 or 5, and a chroma of 4 to 8. At least a part of the Bt horizon has a hue of 5YR or redder. Reddish-colored iron concretions are present in the B horizon and in the upper part of the C horizon. High-chroma mottles are present in the C horizon and the lower part of the B horizon. Where present, the B3g horizon has low-chroma mottles in some areas.

Whitehall soils are adjacent to Pillot and Trempealeau soils and Trempealeau soils, mottled subsoil variant. Whitehall soils have a mantle of silt and contain more clay in the Bt horizon than Trempealeau soils. They have better drainage and contain more silt and clay than is typical for Trempealeau soils, mottled subsoil variant. Whitehall soils have reddish-colored silty sediment that has iron concretions, and Pillot soils do not.

Whitehall silt loam, 0 to 3 percent slopes (WhA).—This soil is in uniformly shaped areas on low stream and river terraces.

Included with this soil in mapping are a few small areas of Pillot and Trempealeau soils and Trempealeau soils, mottled subsoil variant. Also included are a few areas of soils that have a darker plow layer than this soil, a few areas of eroded soils, small areas of Loamy terrace escarpments, and a few small areas of soils that have slopes of more than 3 percent.

Available water capacity is moderate, and natural fertility is medium. The hazard of erosion is slight on gently sloping areas.

Most areas of this soil are suited to corn. Maintenance of tilth and structure is a major concern in areas where corn is continuously grown. Capability unit IIs–1; woodland group 12; wildlife group 4.

Worthen Series

The Worthen series consists of nearly level to gently sloping, well drained and moderately well drained soils in drainageways in draws on uplands and high valley bottoms. These soils formed in silty alluvium. Most areas are along the base of steep uplands. The native vegetation was prairie grasses, tall shrubs, and a few trees, such as oak, silver maple, and hickory.

In a representative profile the surface layer is about 34 inches thick. It is very dark grayish-brown silt loam in the upper part, very dark brown silt loam in the middle part, and very dark grayish-brown silt loam in the lower part. The subsoil is brown silt loam about 8 inches thick. It is underlain by dark grayish-brown silt loam that has yellowish-brown mottles.

Permeability is moderate. Available water capacity is very high. Natural fertility is high. The silty material in the lower part of this soil is unstable where saturated with water.

Most areas of these soils are cultivated and commonly are in corn.

Representative profile of Worthen silt loam, 0 to 3 percent slopes, in a drainageway on the boundary between sec. 26 and sec. 27 and 100 yards south of the northwest corner sec. 26, T. 22 N., R. 9 W.:

Ap—0 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, medium and fine, subangular blocky structure; very friable; neutral; abrupt, smooth boundary.

A12—10 to 28 inches, very dark brown (10YR 2/2) silt loam; weak, coarse, platy structure that parts to weak, medium and fine, platy; very friable; neutral; gradual, wavy boundary.

AB—28 to 34 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, coarse, platy structure that parts to weak, medium, subangular blocky; many worm and root channels filled with dark-brown (10YR 4/3) silt loam; very friable; slightly acid; gradual, smooth boundary.

B2—34 to 42 inches; brown (10YR 4/3) silt loam; weak, coarse, platy structure that parts to weak, medium, subangular blocky; organic coatings on ped faces; very friable; slightly acid; clear, smooth boundary.

C—42 to 60 inches, dark grayish-brown (10YR 4/2) silt loam; weak, coarse, platy structure; peds coated with grayish-brown (10YR 5/2) silt particles and yellowish-brown (10YR 5/4) mottles; vesicular; very friable; slightly acid.

The solum ranges from 34 to 48 inches in thickness. Loose sand is at a depth of 5 to 12 feet.

The A horizon is very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2), or dark brown (10YR 3/3) and ranges from 24 to 36 inches in thickness. Reaction in the Ap horizon is generally medium acid or slightly acid, but it is neutral in limed areas. The B horizon is silt loam.

Worthen soils are adjacent to Huntsville, Downs, and Houghton soils. They have a B horizon and have less stratification of texture in the solum than Huntsville soils. Worthen soils do not have the Bt horizon that Downs soils do, and they have a dark-colored surface layer that is thicker than that of the Downs soils, which is 7 to 10 inches thick. Worthen soils formed in silty alluvium, and Houghton soils typically formed in organic material.

Worthen silt loam, 0 to 3 percent slopes (WoA).—This soil is in uniformly shaped areas in upland draws and on high valley bottoms. Many areas of this soil are gently sloping. Some areas, especially in high upland draws, have a thinner, lighter colored surface layer than is typical.

Included with this soil in mapping are a few areas of soils that have a darker surface layer than this soil and a few small areas of Huntsville and Downs soils. Also included are a few areas of eroded soils and a few small areas of soils that have slopes of more than 3 percent.

Erosion is a hazard in gently sloping areas and where runoff concentrates in drainageways. Small areas of this soil on the bottoms of drainageways are subject to flooding for short periods during wet seasons. The silty material in the lower part of this soil is unstable where wet. A few gullies form if this soil is cultivated intensively.

This soil is suited to corn, oats, and hay. It is commonly used for corn. Control of erosion is a good management practice. Capability unit IIe–5; woodland group 12; wildlife group 4.

Use and Management of the Soils

In this section some of the major uses of the soils in Trempealeau County are described in terms of the limitations and suitabilities of the soils. Some of the management needs of the soils are also discussed. The soils are placed in capability groups that show, in a general way, their limitations and their management needs for farming. The predicted yields of major crops and of pasture are listed for each soil. The soils are grouped according to their suitability for trees, and the soils that have similar broad limitations for woodland and wildlife habitat are also grouped. Finally, information is given about the use of the soils for urban and engineering purposes.

Management of Cultivated Soils

About 60 percent of the land area of Trempealeau County is used for crops and pasture. Corn, oats, and hay are the main crops, and they form the basis for a livestock and dairy industry. Some cash crops, such as soybeans, lima beans, peas, and sweet corn, are grown, especially on soils on the sandy terraces along the Mississippi River. About two-thirds of the soils in the county have slopes of more than 6 percent. On these soils, especially on the moderately steep and steep soils, pasture and grassland farming are emphasized.

The major management needs of the soils in Trempealeau County are maintenance of organic-matter content, soil structure, tilth, and fertility; provision of adequate drainage; and control of erosion. The kind and intensity of management needed varies with the soils and the type of farm operation. Local representatives of the Soil Conservation Service are available to help to determine management needs and to give technical assistance for putting into use conservation practices for the soil and water. The management needs of the soils in the county are discussed in the paragraphs that follow.

Conserving soil and water.—The use of practices that help to conserve soil and water is important in Trempealeau County because most of the sloping and moderately steep soils are cleared and cultivated. Most of the erosion is caused by excessive runoff that scours out gullies, transports soil from the hills, and deposits it in the valleys and streams. Soil blowing is a severe hazard in large areas of sandy soils along rivers and streams. Some large sand dunes and blowout areas are on sandy soils along the Mississippi River.

Stripcropping, contour farming, and growing cover crops are the practices most widely used in Trempealeau County to conserve soil and water. Other practices used are establishing grassed waterways, constructing diversions and terraces, building gulley-control structures, renovating pasture and haylands, planting field windbreaks, and improving areas for wildlife. In addition, water-storage ponds have been built in many places. In some places soil drainage systems have been installed.

Soil and water conservation practices help to increase absorption of water and to decrease runoff, erosion, and pollution of rivers and streams. Knowledge of recent research and much practical experience is helpful in planning land use and in designing and applying the proper soil and water conservation practices to the land. Such information and technical help is available from the local office of the Soil Conservation Service.

The number of farmers that are placing their farms under a complete soil conservation plan is increasing. In 1969 about 41 percent of the farmland of Trempealeau County was under land use practices that help to conserve soil and water.

Maintenance of organic-matter content.—Maintaining the content of organic matter in the soils helps to increase fertility and water intake, to maintain tilth and soil structure, to decrease runoff, and to control water erosion. Applying barnyard manure, plowing under green manure and crop residue, and growing hay in the cropping system help to maintain or to increase the organic-matter content of soils.

Most cultivated soils in Trempealeau County benefit from additions of organic matter. Organic matter helps to increase fertility and the water-holding capacity of sandy soils. Large additions of organic matter help to improve soil structure and tilth, and thereby

increase water intake, decrease runoff, and control erosion. A large supply of organic matter helps to maintain structure and fertility in nearly level loams and silt loams on which row crops are generally grown.

Maintaining soil structure and tilth.—Soils that have good structure take in and hold more water than soils in which the structure has deteriorated (*4*). Also, good structure and tilth help to decrease runoff, to control erosion, and to provide a manageable seedbed that has a fine granular structure. Such a seedbed absorbs moisture and favors vigorous germination of seed, especially for alfalfa and other small-seeded crops.

The structure and tilth of most soils in Trempealeau County have deteriorated in areas that are eroded or where row crops are grown year after year. Using heavy applications of manure and including grasses for hay in the cropping system for several years improve structure and tilth on eroded, sloping soils. Heavy applications of manure and minimum tillage help to maintain structure and tilth in soils on which row crops are grown most of the time.

Maintaining fertility.—The natural supply of plant nutrients in most soils in Trempealeau County has been depleted by farming and erosion. Also, most of the soils are acid, and lime and commercial fertilizer, in addition to barnyard manure, help crop growth. Soils can be tested to determine the amount of lime, nitrogen, phosphorus, and potassium they have available for crop growth. Generally, heavy applications of lime and potassium improve the capability of the soils for the growth of alfalfa, hay, and pasture. In addition, applications of boron are beneficial where loams and sandy loams are used for legumes. Changes in soil reaction affect the availability of plant nutrients (*2*). Phosphorus and nitrogen are more readily available to plants if the soil is nearly neutral in reaction. Generally, smaller and more frequent applications of lime and commercial fertilizer are required to neutralize sandy soils than to neutralize silty or clayey soils.

In addition to liming and fertilizing, other good management practices that will help to promote good growth of crops are preparing a good seedbed; tilling as little as possible; using suitable crops and hybrid seed; planting at suitable plant density per acre; cultivating at the right time; and controlling weeds and insects.

Providing adequate drainage.—Most of the soils on uplands in Trempealeau County are naturally well drained. Many of the soils on the valley bottoms and terraces, however, benefit from supplementary drainage. Draining a wet soil makes it more favorable for upland plants and soil organisms and thus improves the structure of the soil. Furthermore, damage to the roots of plants, particularly alfalfa and sweetclover, by alternate freezing and thawing is reduced. The concurrent lowering of the water table also provides a deeper rooting zone for plants. This deeper zone permits the plants to take up more plant nutrients. In addition, the soil warms earlier in spring if excess water is removed, because evaporation at the surface is reduced and less heat is needed to warm the soil. Soils that are inadequately drained are likely to be 5° to 15° F cooler in spring than well-drained soils.

Erosion control.—Wherever soil is laid bare by cultivation, it is commonly subject to soil blowing or water erosion. About two-thirds of the soils of Trempealeau County have slopes of 6 percent or more. Erosion-control practices, such as contour stripcropping, suitable cropping systems, pasture renovation, grassed waterways, gully-stabilization structures, and shelterbelts, are used in the county. Terraces and diversions are also effective means of controlling erosion.

Contour stripcropping consists of plowing, planting, and tilling at a constant elevation along the slope. The objectives of this method are to hold water where it falls, to increase water intake, and to decrease runoff and erosion. To achieve the best effects from contour stripcropping, a suitable cropping system is used in which hay crops and a row crop are grown in alternate strips (fig. 17). The hay strips slow down and spread out any water that runs off the strips of row crops. This process permits suspended soil material to settle. Moderately steep and steep soils are better suited to hay and pasture than to most other uses. Some of these pasture areas cannot be tilled, because of steepness and susceptibility to erosion. These areas are better suited to pasture renovation. Pasture renovation consists of working the soil enough to prepare a seedbed while leaving a sod mulch, then seeding and fertilizing. If the fertilizer is applied by the broadcast method, it should be worked into the soil before seeding.

Grassed waterways carry runoff from the soils in such a way that little or no erosion occurs. Generally, the waterway is shaped to the proper dimensions, seeded or sodded with suitable grass, and then fertilized. Examples of suitable grasses are bromegrass, tall fescue, and timothy. Some redtop is also used on poorly drained sites. The height of the grass can be controlled by mowing or grazing. Waterways are severely damaged if used for roadways or livestock lanes. If waterways are not managed properly, excessive erosion occurs and gullies form. Once a gully begins to develop, it is difficult to control. Further gullying can be arrested by such gully-stabilization structures as toewalls, earthen dams, and water diversions (fig. 18). The gully is then filled, and the area is seeded to suitable grasses.

Shelterbelts and field windbreaks help to control soil blowing and to protect farmsteads, feedlots, and driveways from snow and cold winds. Sandy and organic soils are more susceptible to blowing than other soils. On sandy soils the strips or belts commonly consist of one to three rows of pine trees, and on organic soils they consist of one to three rows of poplar and willow trees. For efficient protection of fields, the best distance between windbreaks is about 15 to 20 times the height of the windbreaks.

Terraces and diversions are used to shorten slopes and to reduce erosion by intercepting runoff and diverting it to a stable outlet. These structures are made from soil material across a slope either on the contour or on a slight grade. They consist of an earth embankment or a ridge and a channel. Terraces and diversions are more suitable for use on deep loams, silt loams, and silty clay loams that have even slopes than on most other soils.

Capability grouping

Capability grouping shows, in a general way, the

Figure 17.—**Contour strips and an earthern dam help to control runoff and to prevent erosion in a narrow upland valley.**

suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, the kinds of soils are grouped at three levels: the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Figure 18.—**A newly constructed toewall across natural drainageway. Gully that was formerly in the foreground has been filled.**

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow,

droughty, or stony; and *c*, used in some parts of the United States but not in Trempealeau County, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about managment of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–4 or IIIe–6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraphs; and the Arabic numeral specifically identifies the capability unit within each subclass (*9*).

In the following pages the capability units in Trempealeau County are described, and suggestions for the use and management of the soils are given. The capability units are not numbered consecutively in this survey, because not all of the capability units in the statewide system are in Trempealeau County.

CAPABILITY UNIT I–3

Deep, well-drained Downs silt loam, 0 to 2 percent slopes, is the only soil in this unit. The subsoil is silty clay loam.

Permeability is moderate. Available water capacity and natural fertility are high. Soil limitations are slight.

This soil is suited to all crops commonly grown in the county. Corn is the main crop, but some oats and alfalfa are grown. This soil is well suited to pasture.

The major management needs are the maintenance of organic-matter content, fertility, and structure. Manuring, liming, fertilizing, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain structure, fertility, and organic-matter content. Growing deep-rooted alfalfa helps to restore pore space and structure that are partly destroyed by intensive cultivation.

CAPABILITY UNIT IIe–1

This unit consists of deep, gently sloping, well-drained soils in the Downs, Fayette, Palsgrove, Port Byron, and Seaton series, and Palsgrove series, clayey subsoil variant. These soils have a surface layer of silt loam and a subsoil of silt loam, silty clay loam, or clay.

Permeability is generally moderate, but it is moderately slow in the Palsgrove soils, clayey subsoil variant. Available water capacity is moderate in the Palsgrove soil, clayey subsoil variant, and very high in Seaton and Port Byron soils. Natural fertility is high. Organic-matter content is medium or high. The hazard of erosion is slight.

The soils in this unit are suited to all crops commonly grown in the county. Corn, oats, and alfalfa are the main crops. Some areas of these soils on uplands are well suited to pasture and woodland.

The major management needs are the control of erosion and the maintenance of organic-matter content, fertility, and structure. Manuring, fertilizing, liming, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain structure, organic-matter content, and fertility. Growing deep-rooted alfalfa helps to restore pore space and structure that are destroyed by intensive cultivation. These practices, along with grassed waterways, cover crops, and stripcropping, help to control runoff and erosion.

CAPABILITY UNIT IIe–2

This unit consists of deep and moderately deep, gently sloping, well-drained soils in the Gale, Hixton, La Farge, Norden, Urne, Meridian, and Pillot series. These soils have a surface layer of fine sandy loam, loam, or silt loam and a subsoil of very fine sandy loam to silty clay loam.

Permeability is generally moderate, but it is rapid in the lower part of Meridian and Pillot soils. Available water capacity is moderate in all the soils except Urne soils. It is low in Urne soils. Natural fertility is medium. Organic-matter content is medium or high. The hazard of erosion is slight.

These soils are well suited to all crops commonly grown in the county. Corn, oats, and alfalfa are the main crops, but some soybeans are also grown. Some of these soils on uplands are suited to pasture and to hardwoods.

The major management needs are the control of erosion and the maintenance of organic-matter content, fertility, and structure. Manuring, liming, fertilizing, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain organic-matter content, fertility, and structure. Also, growing deep-rooted alfalfa helps to restore pore space and structure that are partly destroyed by intensive cultivation. These practices, along with contour stripcropping, cover crops, terracing, and grassed waterways, help to control runoff and erosion.

CAPABILITY UNIT IIe–5

Deep, well drained and moderately well drained Worthen silt loam, 0 to 3 percent slopes, is the only soil in this unit. The surface layer is thick silt loam, and the subsoil is silt loam.

Permeability is moderate. Available water capacity is very high. Natural fertility is high. The hazard of erosion is slight on gently sloping areas, but the hazard of gully erosion is severe where runoff water concentrates in narrow drainageways.

This soil is suited to corn, oats, and alfalfa. Corn is the main crop.

The major management needs are maintenance of structure in areas where corn is grown year after year and control of gully erosion along drainageways. Manuring, liming, fertilizing, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain the organic-matter content, fertility, and structure. Also, growing deep-rooted alfalfa

increases pore space and restores structure that is partly destroyed by intensive cultivation. Diversions, grassed waterways, toewalls, and earthen dams help to control runoff and erosion.

CAPABILITY UNIT IIw-1

This unit consists of deep, nearly level to gently sloping, poorly drained soils in the Denrock series, wet subsoil variant, Ettrick series, clayey subsoil variant, and Ettrick series. These soils have a surface layer of silt loam and a subsoil of silty clay loam or silty clay.

Permeability ranges from moderately slow to slow. Natural fertility, available water capacity, and organic-matter content are high and very high. The hazard of flooding is moderate. These soils have a seasonal high water table. The hazard of streambank erosion is severe in cultivated or pastured areas. Denrock and Ettrick soils that have a clayey subsoil are difficult to work. Good tilth is difficult to maintain, especially in areas where tillage has extended down into the clayey subsoil. In these areas the soils are sticky when wet and hard when dry. Tillage must be done when the moisture content is optimum. Most areas of these soils are cultivated.

Corn and soybeans are the main crops. Wet areas are suited to pasture or wildlife habitat.

The major management needs are maintenance of structure and tilth, provision of adequate drainage, and protection from stream overflow and runoff from the uplands. Manuring, plowing crop residue under, keeping tillage to a minimum, and developing a good fertility program are practices that help to maintain the organic-matter content, fertility, tilth, and structure. Surface or tile drains, or both, help to provide adequate drainage. Ditching down to the loose, permeable, sandy substratum also helps to drain some areas where wetness is caused by the slow permeability of the clayey subsoil. Dikes and diversions help to protect these soils from flooding by stream overflow and upland runoff from higher-lying areas. Streambank riprap and fencing off of cattle help to prevent streambank erosion.

CAPABILITY UNIT IIw-2

This unit consists of deep, nearly level, somewhat poorly drained soils in the Denrock and Muscatine series. These soils have a surface layer of silt loam and a subsoil of silty clay loam or silty clay.

Permeability is moderate in Muscatine soils and slow in Denrock soils. Natural fertility, available water capacity, and organic-matter content are high. In wet seasons these soils are subject to flooding and have a high water table. Tilth is difficult to maintain in Denrock soils, especially in areas where tillage has extended down into the clayey subsoil. These soils are sticky when wet and hard when dry. Tillage must be done when the moisture content is optimum.

Most areas of these soils are cultivated. Corn is the main crop, but some hay, oats, and soybeans are also grown. Areas of these soils that are subject to flooding are suited to pasture and wildlife habitat.

The major management needs are maintenance of structure and tilth, provision of adequate drainage, and protection from stream overflow and runoff from higher lying areas. Manuring, liming, plowing crop residue under, restricting tillage to a minimum, and fertilizing are practices that help to maintain organic-matter content, fertility, and structure. Dikes and diversions help to provide adequate drainage and protection from runoff and stream overflow. Ditching down to the loose, permeable, sandy substratum helps to drain areas of Denrock soils that are seasonally wet because of slow permeability in the clayey subsoil.

CAPABILITY UNIT IIw-5

This unit consists of deep, nearly level to gently sloping, somewhat poorly drained and poorly drained soils in the Kato and Shiffer series; the Kato series, sandy loam variant; and the Trempealeau series, mottled subsoil variant. These soils have a surface layer of loam or silt loam and a subsoil of sandy loam, loam, or silt loam.

Permeability is moderate in the upper part of these soils and rapid in the lower part. Available water capacity ranges from moderate to high, and natural fertility ranges from medium to high. In wet seasons these soils are subject to flooding and have a high water table.

These soils are suited to corn, oats, hay, and soybeans. Corn is the main crop. Areas of these soils that are wet or that are subject to flooding are suited to pasture and wildlife.

The major management needs are the provision of adequate drainage and protection from stream overflow and runoff from higher lying areas. Keeping tillage to a minimum, plowing crop residue under, manuring, liming, and fertilizing are practices that help to maintain the organic-matter content, fertility, and structure. Dikes and diversions help to provide flood protection, and ditches and surface drains help to provide adequate drainage in wet areas.

CAPABILITY UNIT IIw-8

Deep, nearly level, very poorly drained Palms muck is the only soil in this unit. The subsoil is muck that has partly decomposed plant fibers. It is underlain by loamy sediment.

Available water capacity and organic-matter content are very high. Natural fertility ranges from medium to moderately low. The hazard of flooding is severe. The water table is high in most areas. Streambank erosion is severe in areas of pasture. The hazards of soil blowing and of subsidence are severe in cultivated areas.

If this soil is adequately drained, it is suited to corn. Most areas of this soil are in pasture or wildlife habitat.

The major management needs are provision of drainage, maintenance of fertility, and control of soil blowing. Tile drains, open ditches, dikes, and water diversions help to provide drainage and protect these soils from flooding and runoff. Shelterbelts help to control soil blowing. Fences to keep cattle off the streambank help to prevent streambank erosion. Heavy fertilization helps to maintain fertility.

CAPABILITY UNIT IIw-11

Deep, nearly level to gently sloping, moderately well drained and well drained Huntsville silt loam, 0 to 3 percent slopes, is the only soil in this unit. The surface

layer is thick, dark-colored silt loam. It is underlain by silt loam sediment.

Permeability is moderate. Available water capacity is very high. Natural fertility and organic-matter content are high. This soil is subject to flooding from stream overflow and runoff from higher lying areas. The hazard of gully erosion is severe where runoff water concentrates.

Most areas of this soil are cultivated. Corn is the main crop, but some oats and hay crops are also grown. This soil is suited to all crops commonly grown in the county.

The major management needs are maintenance of soil structure and protection from runoff and stream overflow. Manuring, liming, fertilizing, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain organic-matter content, fertility, and soil structure. Also, growing deep-rooted alfalfa helps to restore pore space and structure that are destroyed by intensive cultivation. Diversions, toewalls, earthen dams, and grassed waterways help to protect the soil from runoff and gully erosion.

CAPABILITY UNIT IIw–13

This unit consists of deep, nearly level to gently sloping, somewhat poorly drained and poorly drained soils in the Boaz, Lawson, and Wallkill series, and areas of Loamy alluvial land. These soils have a surface layer of loam and silt loam and a subsoil mainly of loam or silt loam. Wallkill soils are underlain by muck at a depth of about 24 inches.

Permeability is moderate. Available water capacity ranges from high to very high. Natural fertility is medium to high. The hazard of flooding is moderate to severe because of stream overflow and runoff from higher lying areas. The water table of these soils, especially that of Wallkill soils and Loamy alluvial land, is high in wet seasons. In some areas, the hazard of gully erosion is severe where runoff water concentrates.

Where drainage is adequate, all of the soils in this unit are suited to corn. Most areas of Boaz and Lawson soils are in corn. Most areas of Loamy alluvial land and Wallkill soils are in pasture.

The major management needs are maintenance of adequate drainage in wet seasons and protection from runoff water and stream overflow. Manuring, liming, fertilizing, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain fertility and soil structure. Open ditches and tile drains help to provide adequate drainage in wet seasons. Diversions, toewalls, earthen dams, and grassed waterways help to protect these soils from runoff and gully erosion.

CAPABILITY UNIT IIs–1

This unit consists of deep, nearly level, well drained and moderately well drained soils in the Dickinson, Meridian, Pillot, Trempealeau, and Whitehall series. These soils have a surface layer of loam or silt loam and a subsoil of loam to silty clay loam.

Permeability is moderate in the upper part of these soils and rapid in the lower part. Organic-matter content is high. Available water capacity is generally moderate and natural fertility is generally medium.

Most areas of these soils are cultivated. Corn and soybeans are the main crops, but some oats, alfalfa, and such special cash crops as lima beans and sweet corn are also grown.

The major management needs are the maintenance of organic-matter content, fertility, soil structure, and moisture. Manuring, liming, fertilizing, plowing crop residue under, and keeping tillage to a minimum are practices that help to maintain the organic-matter content, fertility, and structure. Plowing under large amounts of manure and crop residue also helps to increase moisture content. Growing deep-rooted alfalfa helps to restore pore space and soil structure that are destroyed by intensive cultivation.

CAPABILITY UNIT IIIe–1

This unit consists of deep, sloping, well-drained soils in the Downs, Fayette, Palsgrove, Port Byron, and Seaton series and the Palsgrove series, clayey subsoil variant. These soils have a surface layer of silt loam and a subsoil of silt loam, silty clay loam, or clay.

Permeability is moderate and moderately slow. Available water capacity ranges from moderate in Palsgrove soils, clayey subsoil variant, to very high in Port Byron and Seaton soils. Natural fertility is high. The hazard of erosion is moderate.

These soils are suited to all crops commonly grown in the county. Corn, oats, and hay are the main crops. These soils are also well suited to pasture.

The major management needs are the control of erosion and the maintenance of tilth and soil structure. Plowing crop residue under, manuring, liming, and fertilizing are practices that help to maintain the organic-matter content, fertility, tilth, and structure. Also, growing deep-rooted alfalfa helps to restore pore space and soil structure. These practices, along with grassed waterways, terraces, contour strips, and cover crops, help to control runoff and erosion.

CAPABILITY UNIT IIIe–2

This unit consists of moderately deep and deep, sloping, well-drained soils in the Gale, Hixton, La Farge, Norden, Urne, Meridian, and Pillot series. These soils have a surface layer of fine sandy loam, loam, or silt loam and a subsoil of very fine sandy loam to silty clay loam.

Permeability is moderate but ranges to rapid in the lower part of Meridian and Pillot soils. Available water capacity is generally moderate, but it ranges to low in Urne soils. Natural fertility is medium. The hazard of erosion is moderate. Most areas of these soils are eroded.

These soils are suited to all crops commonly grown in the county. Corn, oats, and hay are the main crops. These soils are also suited to pasture.

The major management needs are the control of erosion and the maintenance of tilth, organic-matter content, and soil structure. Plowing crop residue under, manuring, liming, and fertilizing are practices that help to maintain the organic-matter content, fertility, moisture, tilth, and structure. Also, growing deep-rooted alfalfa helps to restore pore space and soil structure. These practices, along with grassed waterways, diversions, contour strips, and cover crops, help to control runoff and erosion.

CAPABILITY UNIT IIIe–7

This unit consists of moderately deep, sloping, well-drained soils in the Billett, Dunnville, and Eleva series. These soils have a surface layer of sandy loam or fine sandy loam and a subsoil of sandy loam or fine sandy loam.

Permeability is moderately rapid and ranges to rapid in the lower parts of Billett and Dunnville soils. Available water capacity and natural fertility are low. The hazard of water erosion is moderate. The hazard of soil blowing is severe on large tracts.

These soils are generally suited to oats, to grasses and alfalfa, and to a limited amount of corn and soybeans. They are also well suited to pine tree plantations.

The major management needs are the control of water erosion and the maintenance of organic-matter content and moisture. Plowing crop residue under, fertilizing, liming, and manuring are practices that help to maintain organic-matter content, fertility, and moisture. Grassed waterways, contour stripcropping, cover crops, and pasture renovation help to control erosion.

CAPABILITY UNIT IIIw–9

Deep, nearly level, very poorly drained Houghton muck is the only soil in this unit. The subsoil is muck that has partly decomposed plant fibers. It is underlain by organic sediment.

Available water capacity is very high. Natural fertility ranges from medium to moderately low. The hazard of flooding is severe. The water table is high in most areas. The hazard of streambank erosion is severe in areas that are pastured. Soil blowing and subsidence are hazards in cultivated areas.

Corn is the main crop grown on this soil in drained areas. Undrained areas of this soil are suited to pasture and wildlife.

The major management needs are provision of drainage, maintenance of fertility, and control of soil blowing on large tracts. Tile drains, open ditches, dikes, and water diversions help to provide drainage and protect these soils from flooding and runoff. Shelterbelts and fences to keep cattle off streambanks help to control soil blowing and streambank erosion. Heavy application of fertilizer helps to maintain fertility.

CAPABILITY UNIT IIIs–4

This unit consists of deep and moderately deep, nearly level and gently sloping, well-drained soils of the Billett, Dickinson, Dunnville, and Eleva series. These soils have a surface layer of sandy loam or fine sandy loam and a subsoil of sandy loam or fine sandy loam.

Permeability is moderately rapid. Available water capacity and natural fertility are low. The hazard of water erosion is slight on sloping areas. The hazard of soil blowing is severe on large tracts.

These soils are suited to corn, soybeans, oats, and alfalfa. They are also suited to pasture and pine trees. Large tracts of Billett, Dickinson, and Dunnville soils are well suited to specialty cash crops in areas where irrigation is feasible. Large tracts of Dickinson soils are in specialty crops grown for cash. Among these crops are lima beans, peas, and sweet corn.

The major management needs are the control of erosion and the maintenance of the content of organic matter and moisture. Plowing crop residue under, manuring, liming, fertilizing, and irrigation are practices that help to maintain organic-matter content, fertility, and moisture. Grassed waterways, contour stripcropping, and shelterbelts help to control runoff and erosion.

CAPABILITY UNIT IVe–1

This unit consists of deep, moderately steep, well-drained soils in the Downs, Fayette, Palsgrove, Port Byron, and Seaton series and Palsgrove series, clayey subsoil variant. These soils have a surface layer of silt loam and a subsoil of silt loam, silty clay loam, or clay.

Permeability is moderate and moderately slow. Available water capacity ranges from moderate in Palsgrove soils, clayey subsoil variant, to very high in Port Byron and Seaton soils. Natural fertility is high. The hazard of erosion is severe. Most areas of these soils are eroded. Gullies are in areas that are intensively cultivated.

The soils in this unit are well suited to grasses and alfalfa for hay or pasture. They are also well suited to hardwoods, such as red and white oaks.

The major management needs are the control of erosion and maintenance of tilth, organic-matter content, and structure. Keeping tillage to a minimum, plowing crop residue under, manuring, liming, and fertilizing are practices that help to maintain organic-matter content, fertility, tilth, and structure. Pasture renovation, grassed waterways, contour stripcropping, cover crops, toewalls, earthen dams, and diversions help to control runoff and erosion.

CAPABILITY UNIT IVe–2

This unit consists of moderately deep, moderately steep, well drained soils in the Gale, Hixton, La Farge, Norden, and Urne series. These soils have a surface layer of fine sandy loam, loam, or silt loam and a subsoil of very fine sandy loam to silty clay loam.

Permeability is moderate. Available water capacity is generally moderate, but it ranges to low in Urne soils. Natural fertility is medium. The hazard of erosion is severe.

These soils are suited to grasses and alfalfa for hay or pasture. They are also well suited to hardwoods, such as red and white oaks.

The major management needs are the control of water erosion and the maintenance of organic-matter content, structure, and tilth. Keeping tillage to a minimum, plowing crop residue under, heavy manuring, liming, and fertilizing are practices that help to maintain the organic-matter content, fertility, tilth, structure, and moisture. Pasture renovation, grassed waterways, contour stripcropping, cover crops, toewalls, earthen dams, and diversions will help to control runoff and erosion.

CAPABILITY UNIT IVe–3

Sloping, well-drained Gale silt loam, shallow, 6 to 12 percent slopes, eroded, is the only soil in this unit. This soil is underlain at a depth of 24 inches by cemented sandstone.

Permeability is moderate. Available water capacity is low to moderate, and natural fertility is low to medium. The hazard of erosion is moderate. If further erosion is not controlled, these soils become shallower and more droughty. Sandstone fragments are in eroded areas where tillage extends into the sandstone bedrock.

These soils are used for corn, oats, and alfalfa-hay but they are better suited to oats and alfalfa-brome hay than to most other crops. They are also suited to pasture and trees.

The major management needs are maintenance of organic-matter content, tilth, structure, and moisture and the control of erosion. Keeping tillage to a minimum, plowing a lot of crop residue under, fertilizing, liming, and heavy manuring are practices that help to maintain organic-matter content, fertility, tilth, structure, and moisture. Grassed waterways, pasture renovation, cover crops, and contour stripcropping will help to control runoff and erosion.

CAPABILITY UNIT IVe–7

This unit consists of moderately deep and deep, moderately steep, well-drained soils in the Billett and Eleva series. These soils have a surface layer and subsoil of sandy loam or fine sandy loam.

Permeability is generally moderately rapid, but it ranges to rapid in the lower part of Billett soils. Available water capacity and natural fertility are low. Soil blowing is a hazard on large tracts of Billett soils. The hazard of water erosion is severe.

These soils are suited to grasses and alfalfa for hay or pasture. They are also well suited to pine trees.

The major management needs are the control of erosion, maintenance of organic-matter content, and the conservation of moisture. Plowing crop residue under, fertilizing, liming, and manuring are practices that help to maintain organic-matter content, fertility, and moisture. Pasture renovation and maintaining cover crops or wooded areas help to control erosion.

CAPABILITY UNIT IVw–5

This unit consists of deep, nearly level to gently sloping, moderately well drained and poorly drained soils in the Morocco series and the Sparta series, mottled subsoil variant. These soils have a surface layer and subsoil of loamy sand.

Permeability is rapid. Available water capacity and natural fertility are low. The water table is seasonally high.

Most areas of these soils are in woodland. Corn, oats, and soybeans are the main crops in cultivated areas. The wetter areas of these soils are well suited to pasture, woodland, and wildlife habitat.

Excessive wetness caused by the seasonally high water table is a concern of management. Manuring, fertilizing, liming, and plowing crop residue under are practices that help to maintain organic-matter content and fertility. Open ditches and dikes help to provide drainage.

CAPABILITY UNIT IVs–3

This unit consists of moderately deep and deep, nearly level to sloping, excessively drained to somewhat excessively drained soils in the Boone, Gotham, Sparta, and Trempe series. These soils have a surface layer of loamy sand or loamy fine sand and a subsoil of sandy loam, sand, or loamy fine sand.

Permeability is rapid. Available water capacity is very low or low. Natural fertility is low. The hazard of soil blowing is severe on large tracts.

These soils are mainly suited to grasses, alfalfa, and a limited amount of oats, corn, and soybeans. Where irrigation is possible, large tracts of these soils are well suited to specialty cash crops, such as lima beans, sweet corn, potatoes, and strawberries. These soils are also well suited to pine tree plantations.

The major management needs are the control of erosion and the maintenance of soil moisture and organic-matter content. Manuring, fertilizing, liming, plowing crop residue under, using cover crops, and establishing shelterbelts are practices that help to maintain organic-matter content, fertility, and moisture and to control soil blowing. Irrigation helps to reduce the hazard of drought.

CAPABILITY UNIT Vw–14

Nearly level Wet alluvial land is the only soil in this unit. It is on bottom lands and flood plains along streams and rivers. It consists mainly of poorly drained and very poorly drained sandy loam, loam, and silt loam sediment.

Permeability is moderate. Available water capacity ranges from moderate to high, and natural fertility ranges from medium to high. The areas have a seasonally high water table and are subject to flooding by stream overflow in wet seasons.

Most areas of this land type are used for wetland pasture, wildlife habitat, and production of bottomland species of trees.

The major management needs are providing good grass cover to help to protect the areas from damage caused by flooding and using fences to keep cattle off streambanks.

CAPABILITY UNIT VIe–1

This unit consists of deep, steep, well-drained soils of the Fayette, Port Byron, and Seaton series and the Palsgrove series, clayey subsoil variant. These soils have a surface layer of silt loam and a subsoil of silt loam, silty clay loam, or clay.

Permeability is moderate, but it ranges to moderately slow in Palsgrove soils, clayey subsoil variant. Available water capacity ranges from moderate in Palsgrove soils, clayey subsoil variant, to very high in Port Byron and Seaton soils. Natural fertility is high. The hazard of erosion is very severe, especially in cultivated areas. Gullies commonly form in areas where these soils have been cultivated or disturbed.

These soils are suited to grasses and alfalfa for pasture or to hardwoods, such as red and white oaks.

The major management needs are control of erosion and maintenance of tilth. Pasture renovating and liming are practices that help to control erosion and to promote good growth of pasture plants. Controlled grazing of pastures and use of gully-control structures, such as toewalls and earthen dams, also help to control runoff and erosion.

CAPABILITY UNIT VIe–2

This unit consists of moderately deep, steep, well-

Figure 19.—**Tree plantings in an area of an Urne-Norden complex in capability unit VIe–2. The very steep Stony and rocky land in the background is in capability unit VIIs–6.**

drained soils of the Hixton, La Farge, Norden, and Urne series. These soils have a surface layer of fine sandy loam, loam, or silt loam and a subsoil of very fine sandy loam to silty clay loam. Soils of the Eleva-Gale complex, 20 to 30 percent slopes, are included in this unit. Some areas of Urne and Norden soils in this unit occur in a complex (fig. 19).

Permeability is moderate. Available water capacity is generally moderate, but it ranges to low in Urne soils. Natural fertility is medium. The hazard of erosion is very severe. Most areas of these soils are eroded, and gullies are in some drainageways where runoff water concentrates.

These soils are suited to grasses and alfalfa for pasture. They are also well suited to hardwoods, such as red and white oaks.

The major management need is the control of erosion. Pasture renovation and controlled grazing are practices that help control erosion and to promote good growth of pasture crops. Toewalls and earthen dams also help to control gully erosion.

CAPABILITY UNIT VIe–3

Moderately steep, well-drained Gale silt loam, shallow, 12 to 20 percent slopes, eroded, is the only soil in this unit. This soil is underlain at a depth of about 24 inches by cemented sandstone.

Permeability is moderate. Available water capacity is moderately low to medium, and natural fertility is moderately low to moderate. The hazard of erosion is severe. If further erosion is not controlled, these soils will become more shallow and droughty. Many sandstone fragments are in some severely eroded areas where tillage extends into the sandstone bedrock.

This soil is suited to pasture, pine tree plantations, and wildlife areas.

The major management needs are control of erosion and maintenance of organic-matter content and tilth. Pasture renovation, controlled grazing, and protection of timber and wildlife areas are practices that help to control erosion and to promote the good growth of pasture crops, timber, and wildlife habitat.

CAPABILITY UNIT VIe–7

Moderately deep, steep, well-drained Eleva sandy loam, 20 to 30 percent slopes, eroded, is the only soil in this unit. The subsoil is sandy loam.

Permeability is moderately rapid. Available water capacity and natural fertility are low. The hazard of erosion is severe.

These soils are well suited to grasses and alfalfa for pasture. They are also well suited to pine tree plantations and wildlife habitat.

The major management needs are maintenance of organic-matter content, conservation of moisture, and control of water erosion. Before reseeding the areas, pasture renovation procedures should be used to help to prevent erosion. Use of fertilizer topdressing, controlled grazing, and protection of woodland and wildlife areas from grazing also help to control erosion and to increase the growth of pasture crops.

CAPABILITY UNIT VIe–9

This unit consists of deep, moderately steep, excessively drained and somewhat excessively drained soils in the Gotham and Sparta series and intricately associated areas of Gotham-Sparta loamy fine sands. These soils have a surface layer and subsoil of loamy fine sand or loamy sand.

Permeability ranges from rapid to very rapid. Available water capacity and natural fertility are low. The hazard of soil blowing is severe.

These soils are mainly suited to grasses for pasture and to pine tree plantations.

The major management need is control of erosion. Cover crops, pasture renovation, and planting of pine trees will help to control erosion.

CAPABILITY UNIT VIs–3

This unit consists of moderately deep and deep, sloping, excessively drained soils in the Boone and Sparta series. These soils have a surface layer of loamy sand and a subsoil of sand or loamy sand.

Permeability is rapid. Available water capacity and natural fertility are low or very low. The hazard of soil blowing is severe. The hazard of water erosion is moderate. Rock outcrops are in severely eroded areas of Boone soils.

These soils are suited to grasses and alfalfa for hay or pasture. They are also well suited to pine tree plantations.

The major management needs are the control of erosion and the maintenance of organic-matter content and moisture. Heavy manuring, plowing crop residue under, liming, using fertilizer as a topdressing, renovating pasture, constructing grassed waterways, and establishing shelterbelts are practices that help to maintain fertility, organic-matter content, and moisture and to control erosion.

CAPABILITY UNIT VIIe–1

Only well-drained Loamy terrace escarpments are in this unit. These escarpments are on steep fronts of stream and river terraces. They have a surface layer of loam or silt loam and a subsoil of sandy loam to silty clay loam.

Permeability is moderate. Available water capacity is moderate to high. Natural fertility is medium to high. The hazard of erosion is very severe. Gullies are in areas where these soils have been disturbed.

These soils are well suited to hardwood timber, wildlife areas, and watershed management areas. South- and southwest-facing slopes have much less potential for tree growth.

The major management need is control of erosion. Protection of these soil areas from grazing helps to control erosion and increase the growth of trees and wildlife.

CAPABILITY UNIT VIIe–2

This unit consists of moderately deep, very steep, well-drained soils in the Hixton, Urne, and Norden series. These soils have a surface layer of fine sandy loam, loam, or silt loam and a subsoil of very fine sandy loam to loam.

Permeability is moderate. Available water capacity generally is moderate, but it ranges to low in Urne soils. Natural fertility is medium. The hazard of erosion is very severe.

These soils are in woodland or in limited pasture. They are well suited to hardwoods, mainly red and white oaks for timber, wildlife, and use as watershed management areas.

The major management need is control of erosion. Limited grazing helps to control erosion and increases the growth of trees and wildlife.

CAPABILITY UNIT VIIe–3

Steep, well-drained Gale silt loam, shallow, 20 to 30 percent slopes, eroded, is the only soil in this unit. The subsoil is friable and is underlain at a depth of about 24 inches by cemented sandstone.

Permeability is moderate. Available water capacity is low. Natural fertility is medium. The hazard of erosion is very severe. If further erosion is not controlled, this soil becomes shallower and droughty. Sandstone fragments are in severely eroded areas.

This soil is well suited to pine tree plantations, wildlife habitat, and watershed areas. This soil is also suited to pasture in areas where controlled grazing is practiced.

The major management needs are the maintenance of tilth and the control of erosion. Protection of woodland, wildlife, and watershed management areas from grazing, pasture renovation in less steep areas, and controlled grazing of pasture help to control erosion and to promote good growth of pasture crops.

CAPABILITY UNIT VIIe–7

This unit consists of moderately deep, steep and very steep, excessively drained and well-drained soils of the Eleva and Boone series. These soils have a surface layer and subsoil mainly of sandy loam, but the Boone soils have a surface layer of loamy sand and a subsoil of loamy sand or sand.

Permeability ranges from moderately rapid to very rapid. Available water capacity ranges from low to very low. Natural fertility is low. The hazard of erosion is severe.

These soils are well suited to pine tree plantations, wildlife habitat, and watershed management areas. Some areas are used for pasture.

The major management needs are the maintenance of organic-matter content, the conservation of moisture, and the control of erosion. Protection of woodland, wildlife habitat, and watershed areas from grazing; pasture renovation; and controlled grazing of areas of pasture help to promote good growth of trees, wildlife, and pasture crops. These practices also reduce losses

of soil and water by helping to control runoff and erosion.

CAPABILITY UNIT VIIs–3

This unit consists of moderately deep and deep, steep and very steep, excessively drained soils in the Boone series and areas of Sandy terrace escarpments. These soils have a surface layer and a subsoil of loamy sand or sand.

Permeability is rapid. Available water capacity and natural fertility are low to very low. The hazards of water erosion and soil blowing are severe.

These soils are well suited to pine tree plantations, wildlife habitat, and watershed management areas. Some areas are used for pasture.

The major management needs are maintenance of organic-matter content, conservation of moisture, and control of erosion. Protection of woodland, wildlife, and watershed management areas from grazing; pasture renovation; and controlled grazing of areas of pasture help to increase the growth of trees, wildlife habitat, and pasture plants. These practices also help to control erosion and to maintain organic-matter content. In addition, they conserve soil moisture by reducing loss of water from runoff.

CAPABILITY UNIT VIIs–6

Only shallow, steep and very steep, excessively drained Stony and rocky land in areas of limestone and sandstone escarpments is in this unit. About 20 percent of this unit is exposed rock. The soil material is varied, but it consists mainly of excessively drained, shallow silt loam that is underlain at a depth of about 20 inches by sandstone and limestone bedrock.

Permeability ranges from moderate to rapid. Available water capacity and natural fertility are moderately low to low.

This land type is suited to woodland, wildlife habitat, and watershed management areas.

The major management need is control of erosion. Protection of these areas from grazing helps to increase the growth of trees and wildlife habitat and to control erosion.

CAPABILITY UNIT VIIs–9

Only nearly level, well-drained to somewhat poorly drained Sandy alluvial land is in this unit. The alluvial sediment is mainly sand, loamy sand, and sandy loam.

Permeability is rapid or very rapid. Available water capacity and natural fertility are low to very low. The water table is seasonally high. In wet seasons most areas of this land type are subject to flooding.

Well-drained areas of this land type are suited to pasture, wildlife habitat, trees adapted to bottom lands, and pine trees.

The major management need is control of erosion during periods of flooding. Constructing fences to keep cattle from streambanks, renovating pastures, and controlling grazing of pasture help to establish a protective sod cover to help to control erosion. Fencing out cattle from woodlands increases tree growth and restores wildlife habitat.

CAPABILITY UNIT VIIIw–15

Only Marsh is in this unit. It is on level flood plains of rivers and streams, mainly Beaver Creek and the Trempealeau, Black, and Mississippi Rivers. The areas of Marsh consist of loamy alluvium or muck and are covered by shallow water for a large part of each year.

These areas are too wet to cultivate or to pasture.

Natural vegetation consists of rushes, sedges, cattails, and other marsh plants. This unit is well suited to wildlife habitat and to water storage areas.

Many areas of Marsh can be improved by building dikes or ditches to control the water level. These areas are esthetically appealing and provide areas for hunting, fishing, and trapping.

CAPABILITY UNIT VIIIs–10

Only Gullied land is in this unit. It is in natural drainageways near the edge of steep slopes on valley bottoms, stream terraces, and upland areas. The soil material consists of well-drained loamy fine sand, fine sandy loam, loam, silt loam, and silty clay loam.

Fertility, organic-matter content, available water capacity, and permeability vary greatly, depending on the slope and texture of the soil material. The hazard of gully erosion is severe, and the areas are dissected by gullies.

These areas are suited to timber and wildlife.

The major management need is stabilization of gullies. Constructing gully-stabilization structures, establishing vegetation, and protecting the areas from grazing are practices that help to control erosion and increase the growth of trees and wildlife.

Predicted yields

Predicted yields for crops commonly grown in the county are given in table 2. The predictions are based on results obtained from agricultural experiment stations, county test plots, and observations by farm workers who are familiar with the soils (*12*).

These yield predictions are averages of those yields to be expected over a period of years and can change at any time with the adoption of new crop varieties, new fertilization programs, or new land-use practices.

Table 2 shows predicted yields for each soil under a high level of management. Under this type of management, wet soils are adequately drained and then are maintained in that state; lime and fertilizer are applied according to the needs indicated by soil tests; good varieties of hybrid grain are seeded; tillage is timely; chemical weed control is commonly used; and forage crops are cut when they will yield hay of good quality.

For corn, a high level of management consists of preparing the seedbed in the usual way; delaying tillage after periods of rain until the soils have dried enough that they do not puddle; where manure is available, applying it at the rate of about 10 tons per acre; broadcasting a fertilizer high in phosphorus and potash before the crop is planted; seeding an adapted hybrid variety at the rate of 18,000 to 22,000 plants per acre; and applying a starter fertilizer, followed later by a sidedressing of nitrogen. Chemical weed control also is generally used.

For oats seeded with a mixture of alfalfa and bromegrass, a high level of management needed to obtain the yields shown in table 2 consists of preparing the seedbed in the usual manner, but not when the soil is

TABLE 2.—*Predicted yields per acre of principal field crops and pasture under a high level of management*

[Absence of a figure indicates that the soil is not suited to the crop or that the crop is not ordinarily grown on the soil]

Soil	Corn	Oats	Alfalfa-brome	Pasture	Soil	Corn	Oats	Alfalfa-brome	Pasture
	Bu	*Bu*	*Tons*	*Animal-unit-days* [1]		*Bu*	*Bu*	*Tons*	*Animal-unit-days* [1]
Billett fine sandy loam, 0 to 2 percent slopes	75	60	2.5	90	Fayette silt loam, 12 to 20 percent slopes, severely eroded	--	50	3.0	115
Billett fine sandy loam, 2 to 6 percent slopes	75	58	2.4	85	Fayette silt loam, 20 to 30 percent slopes	--	--	3.2	115
Billett fine sandy loam, 6 to 12 percent slopes, eroded	65	55	2.0	75	Gale silt loam, 2 to 6 percent slopes	90	65	3.5	120
Billett fine sandy loam, 12 to 20 percent slopes, eroded	55	45	1.8	65	Gale silt loam, 6 to 12 percent slopes	85	60	3.5	110
Boaz silt loam, 0 to 3 percent slopes [2]	95	65	3.5	130	Gale silt loam, 6 to 12 percent slopes, eroded	83	58	3.5	105
Boone loamy sand, 2 to 6 percent slopes	45	35	1.8	50	Gale silt loam, 12 to 20 percent slopes	80	55	3.3	95
Boone loamy sand, 6 to 12 percent slopes, eroded	35	35	1.5	40	Gale silt loam, 12 to 20 percent slopes, eroded	75	50	3.0	90
Boone loamy sand, 12 to 30 percent slopes, eroded	--	--	---	---	Gale silt loam, shallow, 6 to 12 percent slopes, eroded	70	55	2.8	80
Denrock silt loam [2]	95	60	4.0	120	Gale silt loam, shallow, 12 to 20 percent slopes, eroded	--	50	2.5	75
Denrock silt loam, wet subsoil variant [2]	85	60	4.0	110	Gale silt loam, shallow, 20 to 30 percent slopes, eroded	--	--	2.0	65
Dickinson fine sandy loam, 0 to 2 percent slopes	70	55	2.5	85	Gotham loamy fine sand, 0 to 2 percent slopes	60	60	2.5	65
Dickinson fine sandy loam, 2 to 6 percent slopes	68	55	2.5	75	Gotham loamy fine sand, 2 to 6 percent slopes	60	60	2.0	60
Dickinson loam, 0 to 3 percent slopes	80	60	3.0	100	Gotham loamy fine sand, 6 to 12 percent slopes	50	55	2.0	55
Downs silt loam, 0 to 2 percent slopes	120	75	4.5	150	Gotham loamy fine sand, 12 to 20 percent slopes, eroded	--	50	2.0	50
Downs silt loam, 2 to 6 percent slopes	115	75	4.5	150	Gotham-Sparta loamy fine sands, 12 to 20 percent slopes	--	--	1.5	45
Downs silt loam, 6 to 12 percent slopes, eroded	100	70	4.0	140	Gullied land	--	--	---	---
Downs silt loam, 12 to 20 percent slopes, eroded	85	65	4.0	130	Hixton loam, 2 to 6 percent slopes, eroded	85	63	3.0	110
Dunnville fine sandy loam, 0 to 2 percent slopes	65	50	2.3	80	Hixton loam, 6 to 12 percent slopes, eroded	75	60	3.0	105
Dunnville fine sandy loam, 2 to 6 percent slopes	65	50	2.3	80	Hixton loam, 12 to 20 percent slopes, eroded	65	48	2.5	90
Dunnville fine sandy loam, 6 to 12 percent slopes	55	45	2.0	70	Hixton loam, 20 to 30 percent slopes, eroded	--	--	2.3	80
Eleva sandy loam, 2 to 6 percent slopes, eroded	70	60	2.5	90	Hixton loam, 30 to 45 percent slopes	--	--	---	65
Eleva sandy loam, 6 to 12 percent slopes, eroded	65	55	2.5	85	Houghton muck [2]	90	60	3.0	120
Eleva sandy loam, 12 to 20 percent slopes, eroded	50	45	2.2	75	Huntsville silt loam, 0 to 3 percent slopes [3]	115	75	4.5	155
Eleva sandy loam, 20 to 30 percent slopes, eroded	--	--	2.0	65	Kato loam, sandy loam variant [2]	80	60	3.0	135
Eleva-Boone complex, 20 to 45 percent slopes	--	--	---	30	Kato silt loam, 0 to 3 percent slopes [2]	90	65	3.0	135
Eleva-Gale complex, 20 to 30 percent slopes	--	--	2.5	75	La Farge silt loam, 2 to 6 percent slopes, eroded	110	75	4.5	155
Ettrick silt loam [2]	125	60	4.0	140	La Farge silt loam, 6 to 12 percent slopes, eroded	100	70	4.0	145
Ettrick silt loam, clayey subsoil variant [2]	115	55	4.0	120	La Farge silt loam, 12 to 20 percent slopes, eroded	80	65	3.2	125
Fayette silt loam, 2 to 6 percent slopes	110	70	4.5	150	La Farge silt loam, 20 to 35 percent slopes	--	--	3.0	115
Fayette silt loam, 6 to 12 percent slopes	110	65	4.5	135	La Farge silt loam, 20 to 30 percent slopes, eroded	--	--	3.0	115
Fayette silt loam, 6 to 12 percent slopes, eroded	105	65	4.0	130	Lawson silt loam, 0 to 3 percent slopes [3]	110	65	4.0	140
Fayette silt loam, 12 to 20 percent slopes	95	60	3.5	125	Loamy alluvial land	70	50	3.0	130
Fayette silt loam, 12 to 20 percent slopes, eroded	85	60	3.5	125	Loamy terrace escarpments	--	--	2.0	60
					Marsh	--	--	---	---

See footnotes at end of table.

TABLE 2.—*Predicted yields per acre of principal field crops and pasture under a high level of management* —Continued

Soil	Corn	Oats	Alfalfa-brome	Pasture
	Bu	*Bu*	*Tons*	*Animal-unit-days* [1]
Meridian loam, 0 to 2 percent slopes	85	70	3.0	130
Meridian loam, 2 to 6 percent slopes	80	65	3.0	125
Meridian loam, 6 to 12 percent slopes, eroded	75	60	2.5	120
Morocco loamy sand, 0 to 3 percent slopes [2]	55	45	2.3	85
Muscatine silt loam, 0 to 3 percent slopes [2]	130	70	4.5	155
Norden loam, 4 to 12 percent slopes, eroded	90	65	4.0	115
Norden loam, 12 to 20 percent slopes, eroded	70	55	3.2	105
Norden silt loam, 2 to 6 percent slopes, eroded	95	70	4.0	130
Norden silt loam, 6 to 12 percent slopes, eroded	90	65	3.8	125
Norden silt loam, 12 to 20 percent slopes, eroded	75	60	3.5	110
Norden silt loam, 20 to 30 percent slopes, eroded	--	--	3.0	110
Palms muck [2]	100	40	2.1	110
Palsgrove silt loam, 2 to 6 percent slopes	110	70	4.0	150
Palsgrove silt loam, 6 to 12 percent slopes, eroded	85	65	3.8	135
Palsgrove silt loam, 12 to 20 percent slopes, eroded	75	55	3.0	125
Palsgrove silt loam, clayey subsoil variant, 2 to 6 percent slopes	100	65	3.8	135
Palsgrove silt loam, clayey subsoil variant, 6 to 12 percent slopes	95	60	3.5	130
Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes	75	55	2.8	115
Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes, eroded	70	50	2.5	110
Palsgrove silt loam, clayey subsoil variant, 20 to 30 percent slopes	--	--	2.5	105
Palsgrove soils, clayey subsoil variant, 12 to 20 percent slopes, severely eroded	--	38	2.0	95
Pillot silt loam, 0 to 2 percent slopes	90	65	3.5	140
Pillot silt loam, 2 to 6 percent slopes	90	60	3.5	130
Pillot silt loam, 6 to 12 percent slopes, eroded	80	55	3.0	120
Port Byron silt loam, 2 to 6 percent slopes	110	75	4.3	155
Port Byron silt loam, 6 to 12 percent slopes, eroded	105	70	4.0	140
Port Byron silt loam, 12 to 20 percent slopes, eroded	100	65	3.7	135
Port Byron silt loam, 20 to 30 percent slopes	--	--	3.5	120
Sandy alluvial land	55	40	2.5	35
Sandy terrace escarpments	--	--	---	---
Seaton silt loam, 2 to 6 percent slopes	110	75	4.2	150
Seaton silt loam, 6 to 12 percent slopes	105	70	4.5	135
Seaton silt loam, 6 to 12 percent slopes, eroded	100	70	4.0	130
Seaton silt loam, 12 to 20 percent slopes, eroded	85	65	3.4	125
Seaton silt loam, 20 to 30 percent slopes	--	--	3.0	115
Seaton silt loam, 20 to 30 percent slopes, eroded	--	--	2.6	110
Shiffer loam, 0 to 3 percent slopes [2]	90	65	3.0	125
Sparta loamy sand, 0 to 2 percent slopes	55	45	2.5	70
Sparta loamy sand, 2 to 6 percent slopes	50	40	2.2	65
Sparta loamy sand, 6 to 12 percent slopes	43	35	2.0	55
Sparta loamy fine sand, mottled subsoil variant, 0 to 3 percent slopes [2]	60	48	2.7	85
Stony and rocky land	--	--	---	---
Trempe loamy sand, 0 to 2 percent slopes	45	40	2.0	70
Trempe loamy sand, 2 to 6 percent slopes	45	38	2.0	70
Trempealeau loam, 0 to 3 percent slopes	80	65	3.0	120
Trempealeau loam, mottled subsoil variant, 0 to 3 percent slopes [2]	75	65	3.0	110
Urne fine sandy loam, 2 to 6 percent slopes	70	60	3.0	120
Urne fine sandy loam, 6 to 12 percent slopes, eroded	65	58	3.0	110
Urne fine sandy loam, 12 to 20 percent slopes, eroded	--	50	2.7	95
Urne fine sandy loam, 20 to 30 percent slopes, eroded	--	--	2.0	65
Urne fine sandy loam, 30 to 45 percent slopes	--	--	---	50
Urne silt loam, 6 to 12 percent slopes, eroded	75	60	3.4	110
Urne silt loam, 12 to 20 percent slopes, eroded	--	55	3.0	100
Urne silt loam, 20 to 30 percent slopes, eroded	--	--	2.2	90
Urne-Norden complex, 12 to 20 percent slopes, eroded	60	50	3.2	110
Urne-Norden complex, 20 to 30 percent slopes	--	--	2.8	105
Urne-Norden complex, 30 to 45 percent slopes	--	--	---	70
Wallkill silt loam, 0 to 3 percent slopes [2]	100	50	3.0	100
Wet alluvial land	--	--	---	65
Whitehall silt loam, 0 to 3 percent slopes	100	70	3.5	130
Worthen silt loam, 0 to 3 percent slopes [3]	115	75	4.0	145

[1] Animal-unit-day is a term used to express the carrying capacity of pasture. It indicates the number of days one animal can be maintained on 1 acre of pasture without damage to the sod.

[2] Soil requires adequate drainage and protection from overflow for maximum yields.

[3] Soil requires protection from overflow for maximum yields.

Figure 20.—Open groves of oak trees were native vegetation on most valley benches and terraces when early settlers came to Trempealeau County.

wet; planting seed of a good variety that is suited to the soil; and applying a fertilizer that is high in phosphorus and potash before the crop is seeded or at the time of planting. Both lime and fertilizer are applied in amounts indicated by the results of soil tests.

For hay, especially alfalfa hay, a high level of management consists of applying lime according to the needs indicated by the results of soil tests; growing varieties of grasses and legumes that are resistant to wilt and winterkill; cutting the hay three times during the season at times when the forage will be of good quality; allowing little or no grazing of the meadow in fall; and applying a fertilizer as topdressing that is high in phosphorous and potash.

The yields shown in table 2 may very greatly from year to year on a particular soil because of differences in the intensity and distribution of rain, variations in temperature, and other factors. For most soils, crop yields need to be averaged over a 10-year period if an accurate estimate of a soil's capability under a given level of management is to be obtained. Yields on sandy and shallow soils vary more from year to year than those on the deeper soils that have a higher available moisture capacity.

Yields higher than those shown in table 2 can be obtained through use of a larger quantity of a suitable fertilizer and more careful management. The county agent or a representative of the Soil Conservation Service can supply information on seeding mixtures and on the amount of lime and the kind and amount of fertilizer to use.

Woodland [2]

Much of the land area of Trempealeau County was in native prairie grasses intermingled with open stands of oak (fig. 20) when the early settlers arrived in the area. True forest probably covered 30 percent or less of the land area. This forest generally was concentrated on the lowlands along the Black River and in the area north and west of the Trempealeau River. Sawmill operators hauled pine logs into Trempealeau County from nearby counties to the north and east to supplement the oak logs that were used locally as lumber for building.

As farming became widespread, wildfires became less frequent, and young trees sprang up around the older seed trees in the openings of the stands of oak. Many of these areas probably burned again, which

[2] By GEORGE W. ALLEY, woodland conservationist, Soil Conservation Service.

resulted in sprout growth from fire-damaged trees. Today in some steep areas old, thick-butted oaks that have heavy limbs near the ground are surrounded by much younger trees.

The wooded area of Trempealeau County now exceeds 120,000 acres, more than one-fourth of the land area, and is increasing. Changes in farming are chiefly responsible for this shift in land use. About 40 percent of the forest land is grazed by livestock. Much of this area is heavily grazed. Improved farming practices are reducing the amount of grazed acreage yearly.

Landowners in Trempealeau County plant about 700,000 trees, reforesting about 700 acres of land, each year. Most of the trees planted are red and white pines, white and Norway spruce, and black walnut. Red pine is the most commonly planted species.

Some formerly cultivated fields return to woods by natural succession. Pioneer trees that invade these fields are aspen, paper birch, oaks, and maples.

Trees on uplands in the county are mainly oak. In places dry areas of steep, stony land that has slopes facing south and west support stands of predominantly bur oak. Areas of steep, stony land that has slopes facing north and east commonly support stands of black, red, and white oaks. On deeper, gentler sloping, more moist soils, such as Palsgrove, La Farge, Hixton, and Seaton soils, there are stands of red and white oak that commonly include patches of aspen, paper birch, and other hardwoods in scattered areas of deeper soils.

Alluvial land in the stream valleys supports such wetland species as river birch, silver maple, elm, ash, and cottonwood. The largest area of these bottom-land species is along the Black River, and some areas are along the Mississippi.

Sandy soils that are especially well suited to conifers support stands of native white pine. Among these soils are Hixton soils and Loamy terrace escarpments along the Black River. Some native jack pine grows on Boone and Eleva soils, but these stands are small. The total area of native pine stands is very limited.

Expanding demand for many wood products assures a good market for timber in Trempealeau County. A ready market is available for oak veneer logs, oak railroad ties, sawlogs of many species, white-oak stave bolts, pine pulp, aspen box bolts, and soft hardwood bolts for poultry litter shavings. As a result of the needs of this varied market, the woodland manager can derive economic return for much of the material removed in thinnings and the cuttings for the improvement of timber stands.

Gotham, Sparta, and Dickinson soils in the southern part of the county are subject to soil blowing unless protected by proper tillage methods and field windbreaks. The planting of field windbreaks or shelterbelts has been going on for many years in the county, but more planting is needed. Red pine is the preferred tree species for windbreak plantings on these soils.

Woodland groups

The soils of Trempealeau County are placed in woodland groups to aid landowners in planning the use of their woodland. The soils in each group have similar characteristics that affect suitability and growth of the tree species, woodland management, and timber harvest operations.

The potential tree growth for a woodland group is given as site index. Site index is the expected height of dominant trees in the stand at the age of 50 years. The site indexes given are actual measurements taken in or near Trempealeau County on soils of the group.

Also discussed are ratings for hazards and limitations to woodland management. If a hazard or limitation is slight or slight to moderate, it is not discussed.

Seedling mortality, or establishment hazard, refers to the expected loss of seedlings as a result of unfavorable characteristics of the soil. A rating of *slight* indicates that a loss of not more than 25 percent of the seedlings is expected, or that trees ordinarily regenerate naturally where there are adequate sources of seed. A rating of *moderate* indicates that a loss of 25 to 50 percent of the seedlings is expected, or that trees do not ordinarily regenerate naturally in numbers needed for adequate restocking. In some places replanting to fill open spaces will be necessary. A rating of *severe* indicates that a loss of more than 50 percent of the seedlings is expected, or that trees do not ordinarily regenerate naturally.

Plant competition refers to competition from undesirable trees and shrubs that invade the site and hinder the establishment and growth of desirable trees after the woodland has been disturbed by cutting. Competition is *slight* if undesirable species are no special problem. It is *moderate* if the invaders delay but do not prevent the natural regeneration of desirable plants and if simple methods will prevent undesirable trees from invading. Competition is *severe* if trees cannot regenerate naturally. If seedlings are planted, undesirable plants must be controlled by carefully preparing the site and using intensive woodland management.

Equipment limitations refer to the limitation on the use of ordinary equipment caused by unfavorable soil characteristics or topography. Some of the unfavorable characteristics that limit the use of equipment are poor drainage, stones, rocks, and steep slopes. The limitation is *slight* if there is no special problem in use of equipment. It is *moderate* if not all types of equipment can be used at all times, if the periods when wetness or a high water table restricts the use of equipment are not longer than 3 months, or if use of equipment damages the roots of trees to some extent. It is *severe* if many types of equipment cannot be used, if the periods when wetness or a high water table restricts the use of equipment are longer than 3 months, or if the use of equipment seriously damages the roots of trees and the structure and stability of the soil.

Windthrow hazard is related to soil characteristics that affect the development of tree roots and the firmness with which the roots anchor the tree in the soil. The hazard is *slight* if the roots hold the tree firmly against a normal wind. It is *moderate* if the trees are not subject to windthrow except when the soil is excessively wet or the wind velocity is very high. It is *severe* if root development is not deep enough to give adequate stability and individual trees are likely to be blown over if they are released on all sides.

Erosion hazard refers to the risk of erosion on well-managed woodland that is not protected by special practices. If it is *slight* where a small loss of soil is

expected. Generally, erosion is slight if slopes range from 0 to 2 percent and runoff is very slow. The erosion hazard is *moderate* where there is a moderate loss of soil, runoff is not controlled, and the plant cover is not adequate for protection. It is *severe* where steep slopes, rapid runoff, slow infiltration and permeability, and past erosion make the soil susceptible to severe erosion.

In the following pages each of the woodland groups in Trempealeau County is described. The groups are numbered according to a statewide system. Not all of the groups in the State are in this county, so the numbers are not consecutive. The names of the soil series represented are mentioned in the description of each group, but this does not mean that all of the soils of a given series are in that group. The woodland group of each soil mapped in the county is given in the "Guide to Mapping Units."

WOODLAND GROUP 1

This group consists of moderately deep or deep, well-drained loams and silt loams that have a friable subsoil. These soils are gently sloping to very steep and are on uplands and valley benches. In this group are soils of the Eleva, Fayette, Gale, Hixton, La Farge, Norden, Palsgrove, Seaton, and Urne series and of the Palsgrove series, clayey subsoil variant. Also included are Loamy alluvial land and Loamy terrace escarpments.

These soils are fertile. Available water capacity is moderate to high. The rooting zone is deep, except in a few steep, convex areas of the Eleva-Gale complex. The soils in this group are less than 20 inches deep over bedrock. The hazard of windthrow is slight.

The site index is 63 to 75 for red oak. Competition from weeds and grass is moderate to severe. Seedling morality is moderate to severe. Where the soils are steep, the hazard of erosion and equipment limitations are moderate to severe.

The soils in this group are well suited to hardwoods. Red oak and other oaks are the most valuable species. Heavy harvest cutting of the clearcut or shelterwood types helps to secure reproduction of the oak stand, and selective cutting favors conversion to less valuable, shade-tolerant species. White pine, red pine, black walnut, and spruce are well suited to planting for reforestation.

WOODLAND GROUP 3

This group consists of deep or moderately deep, somewhat excessively drained or well-drained loamy sands and fine sandy loams that have a friable or loose subsoil. These soils are nearly level to very steep and are on uplands and terraces. In this group are soils of the Billett, Dickinson, Dunnville, Eleva, Gotham, and Urne series.

These soils generally have low fertility, but fertility ranges to medium in Urne soils. Available water capacity is low. The rooting zone in most areas is moderately deep, but some areas of Urne soils and areas of soils in the Eleva-Boone complex that have convex slopes have a shallow rooting zone. The hazard of windthrow is slight to moderate.

The site index for red oak, on the basis of limited sampling, is about 59. The site index for red and white pines is somewhat higher. Competition from weeds and grass is slight or moderate. Seedling mortality is slight to moderate. Available moisture is somewhat limited, but this limitation is offset by a lack of competition from weeds and brush. Equipment limitations and the hazard of erosion are moderate to severe in steep areas. In places the use of equipment is hampered by rock outcrop, particularly in areas of the Eleva-Boone complex.

Management of existing timber stands on these soils is most profitable if a pine stand is present or can be established. About the only hardwood to which these soils are suited is black oak, and this species is marginally profitable. On the better sites white pine is better suited to reforestation or planting of windbreaks than other trees, and red pine is better suited than other trees on poorer sites.

WOODLAND GROUP 4

This group consists of moderately deep or deep, excessively drained loamy sands. These soils are nearly level to steep and are on uplands and terraces. In this group are soils of the Boone, Gotham, Sparta, and Trempe series and Sandy terrace escarpments.

These soils have low fertility. Available water capacity is low. The rooting zone is generally deep, but it is shallow in a few convex areas of steep Boone soils. The hazard of windthrow is generally slight, but it is severe on Boone soils that are shallow to bedrock.

On the basis of a limited sampling, the site index is 65 to 75 for red and white pines and 40 to 45 for black oaks. Seedling mortality is severe because of the low available water capacity. Equipment limitations and the hazard of erosion are moderate to severe in steep areas. Rock outcrop in some areas of Boone soils also increases the equipment limitations.

Good woodland management is generally aimed toward establishing and maintaining stands of either red or white pine on these soils. Black and white oak sometimes reach merchantable size on these soils, but these species generally are marginal. Reforestation and windbreak plantings are generally made with red pine, but a few white pine are used.

WOODLAND GROUP 5

This group consists of medium-textured, well-drained soils about 24 inches thick. Only soils of the Gale series, shallow phase, are in this group in Trempealeau County.

These soils have low available water capacity. Site index is average to better than average for conifers and is somewhat poorer for hardwood trees. No measurements have been made on trees to determine the site index on these soils.

Seedling mortality is moderate to severe because of moisture limitations. The hazard of windthrow is severe because of limited rooting depth.

WOODLAND GROUP 7

This group consists of deep, somewhat poorly drained loams and silt loams that have a moist subsoil. These soils are nearly level to gently sloping and are on terraces or high bottom lands. In this group are soils of the Denrock and Shiffer series and of the Denrock series, wet variant; the Ettrick series, clayey subsoil variant; and the Kato series, sandy loam variant.

These soils have medium to high fertility. Available water capacity is moderate to high. Most of the soils are moderately permeable to moderately rapidly permeable, but some have a subsoil of silty clay and are slowly permeable. Rooting depth is limited by a seasonally high water table. The hazard of windthrow is high, and harvesting is limited to clearcutting or to very light selective cutting.

The areas of the soils in this group are generally used for crops and are seldom wooded. No site index measurements have been made. Competition from weeds and grass is severe. Seedling mortality is severe for all the soils in this group because of susceptibility to surface ponding and subsequent drownout of the young trees. The hazard of fungus disease is moderate to severe because of the wetness of the sites. Equipment limitations are severe because machinery for planting and harvesting can only be used when the soils are dry or frozen.

The wetland hardwoods that are suited to these soils grow fast. Soft maple, cottonwood, white and green ash, and elms occur naturally on the sites. On most sites, management that favors soft maple and cottonwood is the most profitable. Soft maple, green ash, or cottonwood are well suited to planting, but planting for reforestation is rare on these soils.

WOODLAND GROUP 8

This group consists mainly of somewhat poorly drained soils. Moderately coarse textured and coarse textured Morocco soils and Sparta soils, mottled subsoil variant, are in this group. Some areas of the Sparta soils, mottled subsoil variant, are moderately well drained.

These soils have low available water capacity, but the amount of water available for tree growth is high because of the seasonal high water table. Rooting depth is somewhat limited by wetness. The hazard of windthrow is moderate to severe because of limited rooting depth.

The site index is 49 to 55 for red, white, and jack pine; 54 for red oak; 68 for Tamarack; and 66 to 87 for aspen. Seedling mortality is severe because of susceptibility to drownout. Competition from grass and weeds is severe. Equipment generally can be used only in dry weather or when the soils are frozen.

Soft maple and elm grow mainly on the soils in the wetter sites, and some pines and other species grow on the moderately well drained Sparta soils, mottled subsoil variant. Management of stands of trees on these soils commonly is directed toward such species as elm and soft maple, which can tolerate wet sites. Areas of soils that have better drainage can be managed for white pine, red oak, and other more valuable species. Planting is rarely necessary, because natural reproduction is common, but soft maple is suitable for reforestation.

WOODLAND GROUP 9

This group consists of deep, somewhat poorly drained and poorly drained alluvial loams and silt loams that have a moist, friable subsoil. These soils are on the valley bottoms. In this group are soils of the Boaz, Ettrick, Kato, Lawson, Muscatine, and Wallkill series and Wet alluvial land.

These soils generally have high fertility, but fertility is medium in Wallkill soils. Available water capacity is high or very high. Permeability is moderate, but a seasonal high water table limits the rooting depth.

Seedling mortality, equipment limitations, and competition from weeds and grass are severe. The hazard of soil-related diseases is moderate to severe, and the hazard of windthrow is high. No site index measurements have been made on the soils of this group.

Cottonwood and the soft maples are commonly occurring species on these soils, and they are suitable to favor in managing existing stands. The soils in this group are generally used for farm crops and are seldom reforested, but either soft maple or cottonwood is well suited to this purpose.

WOODLAND GROUP 10

This group consists of deep, poorly drained organic soils on the valley bottoms. In this group are soils of the Palms and Houghton series and areas of Marsh.

These soils have moderately low or medium fertility. Available water capacity is very high. Although permeability is moderately rapid in the Houghton and Palms soils, a high water table and surface ponding create very wet conditions for tree growth throughout most of the growing season. This wetness also severely limits the rooting zone. The hazard of windthrow is very severe, and harvest operations are limited to clearcutting. Tree growth on organic soils is usually slow. Areas of Marsh seldom support trees, because of the prevailing wet conditions.

No site index measurements have been made on soils of the Houghton series. Seedling mortality is severe because of wetness and drownout. Competition from weeds and grass is also severe. Poor trafficability during a large part of the year generally limits harvesting operations until the soils are frozen; consequently, equipment limitations are severe. The hazard of soil-related diseases is high because of the high incidence of fungus growth in the wet soils. Damage from frost action during the growing season and severe mortality to trees as a result of minor fluctuations in the water table are hazards.

Soft maples, elms, ashes, and similar wetland species are naturally occurring hardwoods. A few swamp conifer trees, such as tamarack and black spruce, grow on these soils. Management generally favors the species of value that is present. Tree planting is limited to planting for windbreaks on cropland. Willows are well suited to this purpose.

WOODLAND GROUP 12

This group consists of well drained and moderately well drained, deep loams and silt loams that have a friable subsoil. These soils are nearly level to steep prairie soils on uplands and terraces. In this group are soils of the Dickinson, Huntsville, Port Byron, Trempealeau, Whitehall, Worthen, Meridian, Downs, and Pillot series and the Trempealeau series, mottled subsoil variant.

Soils of this group are fertile, have moderate to high available water capacity, and are moderately permeable. Rooting zones are deep. No site index information is available, because few stands of trees are on these soils. Most of the areas are used for farming.

Competition from weeds and grass is severe. The hazard of seedling mortality is severe on these soils, especially those in areas where slopes face south or west. Equipment limitations and the hazard of erosion are severe in steep areas.

Native stands of trees on these soils consisted of widely spaced oaks of the open-grown or savanna type. Few stands remain. White and red pines, Norway and Black Hills spruce, and northern white cedar are well suited to planting for windbreaks. Planting for woodland purposes is very unlikely on the soils of this group.

WOODLAND GROUP 13

This group consists of areas of Stony and rocky land on uplands and Gullied land. The soil material is well-drained or excessively drained sandy loam, silt loam, and loam.

Available water capacity generally is low, but it ranges to moderate or high in a few silty, concave areas. Fertility is medium, but the rooting zone is restricted in most areas. Tree growth varies greatly, depending on depth to bedrock and the aspect or the direction in which the slopes face. The hazard of windthrow is not so severe as might be expected, because the tree stands are mostly oak, which can resist windthrow because of their deep taproot.

The site index is 54 for black oak on slopes that face north. On the opposite side of the same valley, the site index is 32 for an almost pure stand of bur oak. In a county in central Wisconsin, the site index is 27 for red pine on similar soils that have slopes facing southwest. Only stands of black oak are considered to have commercial value. Seedling mortality is severe, especially where slopes face south and west. Equipment limitations and the hazard of erosion are severe in these steep areas.

Management commonly is directed toward watershed protection, wildlife habitat improvement, beautification, and related purposes, rather than toward production for commercial purposes. Trees generally are not planted in these areas. Some small areas of deeper soils that have higher available water capacity are mapped with Stony and rocky land. Pine trees grow in these areas, although the soils commonly are not suited to pine trees. If a landowner plans to establish trees in such an area for beautification, for wildlife habitat, or as a wind barrier, white or red pines are suitable.

Wildlife[3]

The soils and the relief of Trempealeau County vary widely. Generally, the most fertile soils are in less steep, tillable areas. These soils have the greatest potential for wildlife habitat, but most areas are used for crops. The most extensive areas of wildlife habitat occur in areas of Marsh, Wet alluvial land, Stony and rocky land, and the Eleva-Boone, Eleva-Gale, and Urne-Norden complexes. These areas occupy about 22 percent of Trempealeau County.

The soils of Trempealeau County have been placed into eight wildlife groups according to their suitability for specific elements of wildlife habitat. Each wildlife group consists of soils that require similar management, that respond to management in about the same way, and that have similar hazards or limitations that affect their use. To determine the mapping units in each wildlife group, refer to the "Guide to Mapping Units."

In table 3 each wildlife group is rated good, fair, poor, or very poor for specified elements of wildlife habitat. A rating of *good* indicates that the soil has no limitations or the limitations are easy to overcome; *fair* means that the soils have limitations that can be overcome by average management and manipulation; *poor* means that, for a given use, soils have limitatons that are difficult to overcome; and *very poor* indicates that the soils have limitations that generally preclude their use for a given purpose.

In table 4 the degree of importance of the specified elements of wildlife habitat is given for selected species of wildlife in Trempealeau County. These elements are rated according to their relative importance for each species of wildlife.

Elements rated in tables 3 and 4 are grain and seed crops, grasses and legumes, wild herbaceous upland plants, woody plants (which include hardwood trees and shrubs), coniferous trees, wetland plants, and shallow- and deep-water developments.

Grain and seed crops are corn, oats, sorghum, wheat, barley, rye, soybeans, and other crops that are used as food and cover by wildlife.

Grasses and legumes are bluegrass, bromegrass, timothy, fescue, and such legumes as alfalfa, birdsfoot trefoil, red clover, sweet clover, and vetch that are used as food and cover by wildlife.

Wild herbaceous plants are native or introduced grasses, legumes, and forbs that provide food and cover for upland wildlife and are mainly established by natural means. Bluegrass, prairie grasses, roundhead lespedeza beggarstick, aster goldenrod, and other important plants are in this group.

Woody plants are shrubs, hardwood trees, and coniferous trees. Shrubs are low-growing woody plants, including conifers less than 8 feet tall that furnish fruit, seeds, browse, and cover for wildlife. Examples are viburnum, dogwood, and hazelnut. Oaks, maples, cherry, and nut trees furnish mast, fruit, seeds, dens, cover, and browse for wildlife. Pines, firs, spruce, tamarack, cedar, and other coniferous trees more than 8 feet tall furnish seeds, fruit, browse, and cover for wildlife.

Wetland plants for food and cover are forbs, grasses, sedges, aquatic plants, woody plants, and other plants that grow well in wet areas. These plants furnish fruit, seeds, browse, and cover for wildlife that live in wet areas and on or near open water. Examples are smartweed, canarygrass, sedges, and sagittaria. These plants grow well in seasonally flooded basins and nearly level areas that are covered with water or saturated with water during seasonal wet periods but that are generally relatively dry during much of the growing season, in fresh meadows that are usually not covered by water during the growing season but that are saturated a few inches below the surface, and in shrub swamp areas in which the soil is usually saturated during the growing season and is often covered with as much as 6 inches of water.

[3] By LA VERNE STRICKER, biologist, Soil Conservation Service.

TABLE 3.—*Suitability of soils for elements of wildlife habitat*

Wildlife groups, descriptions of the soils, series, and mapping units	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Woody plants		Wetland plants	Shallow and deep water developments
				Hardwood trees and shrubs	Coniferous trees		
Group 1: Well drained and moderately well drained soils that are loamy throughout and that are not subject to flooding. Downs: DoA, DoB, DoC2, DoD2. Eleva: ElB2, ElC2, ElD2, ElE2, EoE. Fayette: FaB FaC, FaC2, FaD, FaD2, FaD3, FaE. Gale: GaB, GaC, GaC2, GaD, GaD2. Gullied land: Gu. Hixton: HnB2, HnC2, HnD2, HnE2, HnF. La Farge: LfB2, LfC2 LfD2, LfE, LfE2. Loamy terrace escarpments: Lx. Meridian: MdA, MdB, MdC2. Norden: NoC2, NoD2, NrB2, NrC2, NrD2, NrE2. Palsgrove: PgB, PgC2, PgD2. Palsgrove, clayey subsoil variant: PlB, PlC, PlD, PlD2, PlE, PnD3. Seaton: SeB, SeC, SeC2, SeD2, SeE, SeE2. Urne-Norden complex: UrD2, UrE, UrF.	Good where slopes are 0 to 6 percent; fair where slopes are 6 to 12 percent; poor where slopes are 12 to 20 percent; very poor where slopes are more than 20 percent.	Good where slopes are 0 to 12 percent; fair where slopes are 12 to 20 percent; poor where slopes are more than 20 percent.	Good	Good where slopes are 0 to 20 percent; fair where slopes are more than 20 percent.	Good where slopes are 0 to 20 percent; fair where slopes are more than 20 percent.	Poor where slopes are 0 to 2 percent; very poor where slopes are more than 2 percent; few species suited.	Very poor: slopes as steep as 45 percent; moderately to rapidly permeable substratum or slowly permeable substratum underlain by fissured limestone bedrock.
Group 3: Excessively drained to well-drained soils that are sandy or loamy throughout and that have low available water capacity. Billett: BlA, BlB, BlC2, BlD2. Boone: BnB, BnC2, BnE2. Dickinson: DkA, DkB. Dunnville: DuA, DuB, DuC. Eleva: EnF. Gale, shallow phase: GlC2, GlD2, GlE2. Gotham: GoA, GoB, GoC, GoD2, GpD. Sandy terrace escarpments: Sd. Sparta: SpA, SpB, SpC. Trempe: TrA, TrB. Urne: UfB, UfC2, UfD2, UfE2, UfF, UnC2, UnD2, UnE2.	Fair where slopes are 0 to 6 percent; poor where slopes are 6 to 12 percent; very poor where slopes are more than 12 percent; droughty; water erosion hazard.	Fair where slopes are 0 to 12 percent; poor where slopes are more than 12 percent; droughty.	Fair: droughty.	Fair: droughty.	Fair: droughty.	Poor where slopes are 0 to 2 percent; very poor where slopes are more than 2 percent; few species suited.	Very poor: moderately to rapidly permeable subsoil: very pervious substratum.
Group 4: Well drained to moderately well drained soils that have a thick, dark surface layer and that are loamy throughout. Dickinson: DlA. Pillot: PoA, PoB, PoC2. Port Byron: PrB, PrC2, PrD2 PrE. Trempealeau: TuA. Whitehall: WhA. Worthen: WoA.	Good where slopes are 0 to 6 percent; fair where 6 to 12 percent; poor where 12 to 20 percent; very poor where more than 20 percent.	Good where slopes are 0 to 12 percent; fair where 12 to 20 percent; poor where more than 20 percent.	Good	Fair: grass competition.	Fair: grass competition; some species not suited.	Poor where slopes are 0 to 2 percent; very poor where more than 2 percent; few species unsuited.	Poor where slopes are 0 to 6 percent; very poor where more than 6 percent; moderately permeable subsoil; pervious to very pervious substratum.

TABLE 3.—*Suitability of soils for elements of wildlife habitat*—Continued

Wildlife groups, descriptions of the soils, series, and mapping units	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Woody plants		Wetland plants	Shallow and deep water developments
				Hardwood trees and shrubs	Coniferous trees		
Group 5a: Somewhat poorly drained soils. Boaz: BmA. Denrock: Dc. Morocco: MoA. Muscatine: MuA. Shiffer: ShA. Sparta, mottled subsoil variant: SrA. Trempealeau, mottled subsoil variant: TvA.	Good where adequately drained; fair where undrained: seasonally wet.	Good where adequately drained; fair where undrained: seasonally wet; some species not suited.	Fair: seasonally wet; some species not suited.	Fair: seasonally wet; some species not suited; grass competition.	Fair: seasonally wet; some species not suited; grass competition.	Fair: where slopes are less than 2 percent; some species not suited.	Good.
Group 5b: Poorly drained soils. Denrock, wet subsoil variant: De. Ettrick: Er. Ettrick, clayey subsoil variant: Et. Kato: KcA. Kato, sandy loam variant: Ka. Marsh: Ma. Wallkill: WaA. Wet alluvial land: We.	Good where adequately drained; very poor where undrained; wet soils.	Fair where adequately drained; very poor where undrained; wet soils; few species suited.	Poor: wet soils; few species suited.	Poor: wet soils; few species suited; grass competition.	Poor: wet soils; few species suited; grass competition.	Good: wet soils.	Good.
Group 6: Poorly drained and very poorly drained organic soils. Houghton: Ho. Palms: Pa.	Fair where drained; very poor where undrained.	Fair where drained; very poor where undrained; few species suited.	Very poor: wet soils; few species suited.	Poor: wet soils; few species suited.	Fair: wet soils; some species not suited.	Good where slopes are 0 to 2 percent; fair where slopes are more than 2 percent; wet soils.	Good.
Group 7: Well-drained to somewhat poorly drained soils that are subject to flooding. Huntsville: HuA. Lawson: LsA. Loamy alluvial land: Lv. Sandy alluvial land: Sa.	Good: hazard of water erosion; fair on Sa soils; droughty.	Fair: some species not suited.	Good	Fair	Fair: some species not suited.	Fair in narrow areas on drainageways; poor in better drained areas: some species not suited.	Poor: variable permeability.
Group 8: Very shallow, droughty soils. Stony and rocky land: St.	Very poor: steep; hazard of water erosion.	Very poor: some species not suited.	Poor: some species not suited.	Poor: some species not suited; grass competition.	Poor: some species not suited; grass competition.	Very poor	Very poor: shallow to fissured limestone.

Shallow-water areas are less than 5 feet deep and include natural and dug-out water areas or water areas formed by a combination of dug-out areas and low embankments. Common plants are cattails, bulrushes, sedges, and reeds. These areas consist of shallow marshes in which the soil is saturated or covered with as much as 6 inches of water during the growing season and deep marshes that are covered by 6 inches to about 3 feet of water during the growing season.

Deep-water areas are more than 5 feet deep and consist of natural water areas, dug-out areas, or water areas formed by a combination of dug-out areas and embankments. Common plants are coontail, water lilies, milfoil, and waterweed. The deep-water areas consist of ponds, lakes, and open fresh water areas that include shallow ponds and reservoirs or areas where water is less than 10 feet deep.

In table 4 the importance of elements of wildlife habitat is not rated for all species that occur in the county. Where habitat requirements are known for a

TABLE 4.—*Importance of elements of wildlife habitat for selected species of wildlife*

[A rating of 4 means very important; 3, important; 2, some value; and 1, little or no value. Absence of a rating indicates that the element is not relevant to the species]

Wildlife	Grain and seed crops		Grasses and legumes		Wild herbaceous upland plants	Woody plants			Wetland plants	Water areas	
	Harvested	Unharvested	Harvested	Unharvested		Shrubs	Hardwood trees	Coniferous trees		Shallow water	Deep water
Migratory waterfowl:											
Ducks	3	3	1	3	3	--	1	--	[1]4	[1]4	4
Geese	4	4	4	1	--	--	--	--	2	3	4
Upland game birds:											
Hungarian partridge	4	4	3	4	4	1	--	--	1	--	--
Pheasant	4	4	--	[1]4	[1]4	4	--	1	[1]4	3	--
Quail	4	4	2	4	4	[1]4	2	1	4	3	--
Ruffed grouse	1	1	1	2	2	[1]4	[1]4	3	--	--	--
Sharp-tailed grouse	3	4	3	4	4	4	3	1	4	1	--
Woodcock	--	--	1	3	3	4	4	2	3	--	--
Small game:											
Cottontail rabbit	3	4	3	[1]4	[1]4	[1]4	3	1	2	3	--
Snowshoe rabbit	--	--	--	1	1	[1]4	3	[1]4	1	--	--
Raccoon	3	4	--	1	1	2	4	--	1	[1]4	4
Squirrel	3	4	--	1	1	2	[1]4	1	--	--	--
Large game: Deer	3	4	3	3	4	4	4	4	3	3	2
Fur bearers:											
Beaver	--	--	--	--	--	4	[1]4	--	4	4	[1]4
Red fox	2	3	2	3	3	3	2	1	3	3	1
Mink	--	--	--	--	--	2	1	1	3	[1]4	[1]4
Muskrat	1	1	--	--	--	1	--	--	4	[1]4	[1]4

[1] Key or critical elements for the species.

species not rated, they may be compared to another species having about the same requirements. Songbirds make up an important segment of the wildlife in Trempealeau County, but their habitat elements were not rated. The wide variety of habitat requirements for the numerous species of songbirds prohibits any one set of elements being equally satisfactory for all. In general, the maximum variety of habitat will produce the most variety and highest populations of songbirds.

Engineering Uses of the Soils [4]

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissioners, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, drainage, shrink-swell potential, grain size, plasticity, and reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

[4] ROBERT C. BINTZLER, assistant State conservation engineer, Soil Conservation Service, helped to prepare this section.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational areas.
2. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
3. Seek sources of gravel, sand, or clay.
4. Plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for controlling water and conserving soil.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Develop preliminary estimates pertinent to construction in a particular area.

Most of the information in this section is presented in tables 5, 6, and 7, which show, respectively, several estimated soil properties significant to engineering; interpretations of engineering properties; and results of engineering laboratory tests on soil samples.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 5 and 6, and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engi-

neering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 5 feet. Also, inspection of sites, especially of small ones, is needed because many delineated areas of a given soil mapping unit contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have different meanings in soil science than in engineering. The Glossary defines many of these terms as they are commonly used in soil science.

Engineering classification systems

The two systems most commonly used in classifying samples of soils for engineering are the Unified system (*11*), used by the SCS engineers, Department of Defense, and others, and the AASHO system (*1*), adopted by the American Association of State Highway Officials.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example CL-ML.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in A–7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As additional refinement the engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. The AASHO classification for tested soils, with group index numbers in parentheses, is shown in table 7; the estimated classification, without group index numbers, is given in table 5 for all soils mapped in the survey area.

Soil properties significant to engineering

Several estimated soil properties significant in engineering are given in table 5. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance for soil engineering. The estimates are based on field observations made in the course of mapping, on test data for these and similar soils, and on experience with the same kinds of soil in other counties. Following are explanations of some of the columns in table 5.

Depth to bedrock is distance from the surface of the soil to the upper surface of the rock layer.

Depth to seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 5 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the soil contains gravel or other particles coarser than sand, an appropriate modifier is added, as for example, "gravelly loamy sand". "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Permeability is that quality of a soil that enables it to transmit water or air. It is estimated on the basis of those soil characteristics observed in the field, particularly structure and texture. The estimates in table 5 do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

Available water capacity is the ability of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point of most crop plants.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils causes much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Corrosivity, as used in table 5, pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to soil properties, such as drainage, texture, total acidity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate, but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of *low* means that there is a low probability of soil-induced corrosion damage. A rating of *high* means that there is a high probability of damage, so that protective measures for steel and more resistant concrete should be used to avoid or minimize damage.

Interpretations of engineering properties

The estimated interpretations in table 6 are based on the engineering properties of soils shown in table 5, on test data for soils in this survey area and others nearby or adjoining, and on the experience of engineers and soil scientists with the soils of Trempealeau County. In table 6, ratings are used to summarize

TABLE 5.—*Estimated soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. the instructions for referring to other series that appear in

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHO
	Feet	*Feet*	*Inches*			
Billett: BlA, BlB, BlC2, BlD2	>5	>5	0–9	Fine sandy loam	SM	A–4
			9–30	Fine sandy loam	SM	A–4
			30–60	Sand	SP–SM	A–3
Boaz: BmA	>5	1–3	0–16	Silt loam	CL	A–6
			16–38	Heavy silt loam	CL	A–6
			38–60	Silt loam	CL	A–6
Boone: BnB BnC2, BnE2	2–4	>5	0–15	Loamy sand	SM	A–2
			15–25	Sand	SP–SM	A–3
			25–60	Sandstone.[3]		
Denrock: Dc	>5	[4]1–3	0–11	Silt loam	CL	A–6
			11–50	Silty clay	CH	A–7
			50–60	Sand	SP–SM	A–3
Denrock, wet subsoil variant: De	>5	[4]0–1	0–12	Silt loam	CL	A–6
			12–50	Silty clay	CH	A–7
			50–60	Sand	SP–SM	A–3
Dickinson: DkA, DkB, DlA	>5	>5	0–27	Fine sandy loam	SM	A–2
			27–60	Fine sand and loamy sand	SM	A–2
Downs: DoA, DoB, DoC2, DoD2	>5	>5	0–11	Silt loam	ML	A–4
			11–51	Silty clay loam	CL	A–6
			51–60	Silt loam	ML	A–4
Dunnville: DuA, DuB, DuC	>5	>5	0–26	Fine sandy loam	SM	A–2
			26–50	Fine and medium sand	SP–SM	A–3
*Eleva: ElB2, ElC2, ElD2, ElE2, EnF, EoE. For Boone part of EnF, see Boone series; for Gale part of EoE, see Gale series.	2–5	>5	0–5	Sandy loam	SM	A–2
			5–30	Sandy loam	SM	A–3 or A–4
			30–36	Sand	SP–SM	A–3
			36–60	Sandstone.[3]		
Ettrick: Er	>5	0–1	0–12	Silt loam	CL	A–7
			12–38	Silty clay loam	CH	A–7
			38–60	Silt loam	CL	A–7
Ettrick, clayey subsoil variant: Et	>5	[4]0–1	0–16	Heavy silt loam	CL	A–7
			16–46	Silty clay	CH	A–7
			46–60	Sand	SP–SM	A–3
Fayette: FaB, FaC, FaC2, FaD, FaD2, FaD3 FaE.	>5	>5	0–13	Silt loam	ML	A–4
			13–43	Silty clay loam	CL	A–7
			43–60	Silt loam	CL	A–6
Gale:						
GaB GaC, GaC2, GaD, GaD2	2–5	>5	0–12	Silt loam	ML	A–4
			12–34	Silt loam	CL	A–6
			34–40	Loamy sand	SM	A–2
			40–60	Sandstone.[3]		
GlC2, GlD2, GlE2	1½–2½	>5	0–8	Silt loam	ML	A–4
			8–20	Heavy silt loam	CL	A–6
			20–34	Loam	ML	A–4
			34–60	Sandstone.[3]		
*Gotham: GoA, GoB, GoC, GoD2, GpD. For Sparta part of GpD, see Sparta series.	>5	>5	0–9	Loamy fine sand	SM	A–2
			9–36	Heavy loamy sand	SM	A–2
			36–60	Sand	SP–SM	A–3 or A–2

See footnotes at end of table.

significant to engineering

The soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the first column of this table. The symbol > means more than]

Percentage less than 3 inches passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity[1]	
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
			Inches per hour	*Inches per inch of soil*	*pH*			
100	70–85	35–45	2.0–6.3	0.14–0.16	6.1–6.5	Low	Low	Moderate.
100	70–85	40–50	2.0–6.3	0.12–0.14	5.1–6.5	Low.		
100	50–70	5–10	6.3–20.0	0.05–0.07	5.6–6.0	Very low.		
100	90–100	85–95	0.63–2.0	0.22–0.24	[2] 5.6–6.5	Low	High	Low.
100	90–100	85–95	0.63–2.0	0.20–0.22	5.6–6.0	Moderate.		
100	90–100	85–95	0.63–2.0	0.20–0.22	6.1–6.5	Moderate.		
100	50–75	15–20	>20.0	0.12–0.15	4.6–5.5	Very low	Low	High.
90–100	50–70	5–10	>20.0	0.05–0.07	5.1–5.5	Very low.		
100	90–100	85–95	0.63–2.0	0.22–0.24	5.1–5.5	Moderate	High	Low.
100	95–100	95–100	0.06–0.2	0.12–0.14	6.1–7.9	High.		
100	65–80	5–10	6.3–20.0	0.05–0.07	6.6–7.3	Very low.		
100	90–100	85–95	0.63–20.0	0.22–0.24	[2] 6.6–7.3	Moderate	High	Low.
100	95–100	95–100	0.06–0.2	0.12–0.14	6.1–7.8	High.		
100	65–80	5–10	6.3–20.0	0.05–0.07	6.6–7.3	Very low.		
100	95–100	25–35	2.0–6.3	0.14–0.16	5.1–6.0	Very low	Low	High.
100	65–80	15–20	6.3–20.0	0.05–0.08	5.1–5.5	Very low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Moderate	Moderate	Moderate.
100	95–100	90–100	0.63–2.0	0.20–0.22	5.6–6.5	Moderate.		
100	95–100	80–90	0.63–2.0	0.20–0.22	5.6–6.0	Low.		
100	70–85	25–35	2.0–6.3	0.16–0.18	5.1–5.5	Very low	Low	Moderate.
100	65–80	5–10	6.3–20.0	0.05–0.07	5.6–6.0	Very low.		
100	60–70	25–35	2.0–6.3	0.13–0.15	5.6–6.0	Very low	Low	High.
	60–70	30–40	2.0–6.3	0.12–0.14	5.1–6.0	Very low.		
100								
100	50–70	5–10	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		
100	90–100	90–95	0.63–2.0	0.22–0.24	6.6–7.3	Moderate	High	Low.
100	95–100	90–95	0.20–0.63	0.20–0.22	6.6–7.3	High.		
100	90–100	85–95	0.20–0.63	0.20–0.22	6.6–7.3	Moderate.		
100	90–100	85–95	0.63–2.0	0.22–0.24	6.6–7.3	Moderate	High	Low.
100	95–100	85–95	0.20–0.63	0.12–0.14	6.6–7.3	High.		
100	50–70	5–10	6.3–20.0	0.05–0.07	5.6–6.0	Very low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.1–6.5	Low	Low	Moderate.
100	95–100	90–100	0.63–2.0	0.18–0.20	5.1–6.0	Moderate.		
100	95–100	90–100	0.63–2.0	0.20–0.22	5.6–6.0	Moderate.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Low	Low	Moderate.
100	90–100	90–100	0.63–2.0	0.20–0.22	5.1–6.0	Moderate.		
85–95	50–75	15–20	6.3–20.0	0.08–0.10	5.6–6.0	Very low.		
100	90–100	85–95	0.63–2.0	0.22–0.24	5.6–6.0	Low	Low	Moderate.
100	90–100	85–95	0.63–2.0	0.20–0.22	5.1–6.0	Low.		
90–95	85–95	55–65	2.0–6.3	0.17–0.19	5.6–6.0	Low.		
100	90–95	15–30	6.3–20.0	0.10–0.12	5.1–5.5	Very low	Low	High.
100	90–95	15–25	6.3–20.0	0.09–0.11	5.1–5.5	Very low.		
100	65–80	0–15	6.3–20.0	0.05–0.10	5.1–5.5	Very low.		

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHO
	Feet	*Feet*	*Inches*			
Gullied land: Gu. Variable; no valid estimates can be made.						
Hixton: HnB2, HnC2, HnD2, HnE2, HnF	2–5	>5	0–10	Loam	ML	A–4
			10–34	Loam	ML	A–4
			34–40	Sand	SP–SM	A–3
			40–60	Sandstone.[3]		
Houghton: Ho	>5	0–1	0–60	Muck	Pt	([5])
			60–70	Loamy sand	SM	A–2
Huntsville: HuA	>5	4–6	0–38	Silt loam	ML or CL	A–4 or A–6
			38–60	Silt loam	ML	A–4
Kato, sandy loam variant: Ka	>5	1–2	0–11	Loam	ML	A–4
			11–30	Sandy loam	SM	A–2 or A–4
			30–60	Sand	SP or SM	A–3 or A–2
Kato: KcA	>5	0–1	0–10	Silt loam	CL	A–6
			10–34	Silt loam	CL	A–6
			34–60	Sand	SP–SM	A–3
La Farge: LfB2, LfC2, LfD2, LfE, LfE2	>5	>5	0–9	Silt loam	ML	A–4
			9–29	Silty clay loam	CL	A–6
			29–36	Loam and sandy loam	ML or SM	A–2 or A–4
			36–60	Soft sandstone.[3]		
Lawson: LsA	>5	1–5	0–30	Silt loam	ML or CL	A–6
			30–60	Silt loam	ML or CL	A–6
Loamy alluvial land: Lv	>5	1–5	0–9	Silt loam	ML	A–4
			9–40	Sand and silt	SM or ML	A–2 or A–4
Loamy terrace escarpments: Lx	>5	>5	0–40	Loam and silt loam	ML	A–4
Marsh: Ma. Variable; no valid estimates can be made.						
Meridian: MoA, MdB, MdC2	>5	>5	0–9	Loam	SM or ML	A–4
			9–30	Loam	SC–SM or ML	A–4
			30–60	Sand	SP	A–3
Morocco: MoA	>5	1–3	0–16	Loamy sand	SM	A–2
			16–60	Sand	SP	A–3
Muscatine: MuA	>5	1–3	0–15	Silt loam	CL	A–7
			15–45	Silty clay loam	CH	A–7
			45–60	Silt loam	CL	A–6

See footnotes at end of table.

significant to engineering—Continued

Percentage less than 3 inches passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity[1]	
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
			Inches per hour	*Inches per inch of soil*	*pH*			
100	85–95	50–60	0.63–2.0	0.20–0.22	[2]5.1–6.5	Low	Low	Moderate.
100	85–95	55–65	0.63–2.0	0.17–0.19	4.5–6.0	Low.		
90–100	50–70	5–10	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		
([5])	([5])	([5])	2.0–6.3	0.25–0.35	6.6–7.3	Very low	High	Low.
90–100	50–75	15–25	6.3–20.0	0.12–0.16	6.6–7.3	Very low.		
100	95–100	80–100	0.63–2.0	0.22–0.24	5.6–7.3	Moderate	Moderate	Moderate.
100	90–100	70–90	0.63–2.0	0.22–0.24	5.6–6.0	Low.		
100	60–70	50–65	2.0–6.3	0.20–0.22	5.1–6.0	Low	Moderate to high.	High.
100	60–70	30–50	2.0–6.3	0.12–0.14	5.1–5.5	Low.		
85–95	50–70	0–15	6.3–20.0	0.05–0.10	4.5–6.0	Very low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	5.6–6.0	Moderate	High	Moderate.
100	95–100	90–100	0.63–2.0	0.20–0.22	5.1–5.5	Moderate.		
100	65–80	5–10	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	6.1–7.3	Low	Moderate	Moderate.
100	90–100	85–95	0.63–2.0	0.18–0.20	5.1–5.5	Moderate.		
100	85–95	30–55	0.63–2.0	0.14–0.19	5.1–6.5	Low.		
100	90–100	80–100	0.63–2.0	0.22–0.24	6.6–7.3	Moderate	High	Low.
100	90–100	70–90	0.63–2.0	0.20–0.22	6.6–7.3	Moderate.		
100	90–100	70–90	0.63–2.0	0.20–0.24	6.1–6.5	Moderate	Moderate	Low.
100	90–100	15–80	0.63–2.0	0.11–0.18	7.9–8.4	Low.		
100	85–100	50–95	0.63–2.0	0.14–0.24	5.1–6.5	Low	Low	Low to moderate.
100	85–95	40–55	0.63–2.0	0.20–0.22	[2]6.6–7.3	Low	Low	Moderate.
100	85–95	45–60	0.63–2.0	0.17–0.19	5.1–7.3	Low.		
100	65–80	0–5	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		
100	50–75	15–20	6.3–20.0	0.10–0.12	5.1–6.0	Very low	Low to moderate.	Moderate.
100	50–75	0–5	6.3–20.0	0.05–0.07	5.6–6.0	Very low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2]6.6–7.3	Moderate	High	Moderate.
100	95–100	90–100	0.63–2.0	0.18–0.20	5.1–6.5	High.		
100	90–100	85–95	0.2–0.63	0.20–0.22	5.6–6.0	Moderate.		

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHO
	Feet	*Feet*	*Inches*			
Norden: NoC2, NoD2, NrB2, NrC2, NrD2, NrE2.	2–4	>5	0–12	Silt loam	ML	A–4
			12–30	Loam	ML	A–4
			30–60	Soft sandstone.[3]		
Palms: Pa	>5	0–1	0–32	Muck	Pt	([5])
			32–40	Silt loam	ML	A–4
Palsgrove: PgB, PgC2, PgD2	4–8	>5	0–12	Silt loam	ML	A–4
			12–38	Silty clay loam	CL	A–7
			38–60	Clay	CH	A–7
Palsgrove, clayey subsoil variant: PlB, PlC, PlD, PlD2, PnE, PlD3.	4–8	>5	0–8	Silt loam	ML	A–4
			8–15	Silty clay loam	CL	A–7
			15–60	Clay	CH	A–7
Pillot: PoA, PoB, PoC2	>5	>5	0–11	Silt loam	ML	A–4
			11–34	Silty clay loam	CL	A–7
			34–60	Sand	SP	A–3
Port Byron: PrB, PrC2, PrD2, PrE	>5	>5	0–12	Silt loam	ML	A–6
			12–60	Silt loam	CL	A–6
			60–72	Silt loam	CL or ML	A–6 or A–4
Sandy alluvial land: Sa	>5	1–5	0–15	Loamy sand	SM	A–2
			15–60	Sand	SP or SM	A–3 or A–2
Sandy terrace escarpments: Sd	>5	>5	0–40	Sand and loamy sand	SP or SM	A–3 or A–2
Seaton: SeB, SeC, SeC2, SeD2, SeE, SeE2	>5	>5	0–10	Silt loam	ML	A–4
			10–41	Silt loam	ML or CL	A–4 or A–6
			41–60	Silt loam	ML or CL	A–4
Shiffer: ShA	>5	1–3	0–9	Loam	ML	A–4
			9–29	Loam	ML	A–4
			29–60	Sand	SP or SM	A–3 or A–2
Sparta: SpA, SpB, SpC	>5	>5	0–30	Loamy sand	SM	A–2
			30–60	Sand	SP	A–3
Sparta, mottled subsoil variant: SrA	>5	2–5	0–25	Loamy fine sand	SM	A–2
			25–44	Sand	SP	A–3
Stony and rocky land: St	0–2	>5	0–24	Sandy loam to silt loam	SM or ML	A–2 or A–4
			24–60	Dolomitic limestone and sandstone.[3]		
Trempe: TrA, TrB	>5	>5	0–23	Loamy sand	SM	A–2
			23–60	Sand	SP	A–3

See footnotes at end of table.

significant to engineering—Continued

Percentage less than 3 inches passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity[1]	
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
			Inches per hour	*Inches per inch of soil*	*pH*			
100	90–100	85–100	0.63–2.0	0.22–0.24	5.6–6.0	Low.		
100	85–95	55–65	0.63–2.0	0.17–0.19	5.1–6.0	Low	Low	Moderate.
[5]	[5]	[5]	2.0–6.3	0.25–0.35	6.1–6.5	Low	High	Moderate.
100	90–100	60–90	2.0–6.3	0.18–0.22	7.4–7.8	Low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	5.6–6.0	Low	High	Low.
100	95–100	90–100	0.63–2.0	0.18–0.20	5.6–6.0	Moderate.		
85–95	85–95	80–95	0.20–0.63	0.09–0.11	5.6–6.0	High.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Low	High	Low.
100	95–100	90–100	0.63–2.0	0.18–0.20	6.1–6.5	Moderate.		
85–95	85–95	80–95	0.20–0.63	0.09–0.11	5.1–7.8	High.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Low	High.	
100	90–100	85–95	0.63–2.0	0.18–0.20	4.5–5.5	Moderate.		
100	65–80	0–5	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Low	Low to moderate.	Moderate.
100	95–100	90–100	0.63–2.0	0.20–0.22	5.6–6.0	Moderate.		
100	90–100	80–100	0.63–2.0	0.20–0.22	5.6–6.0	Low.		
90–100	50–90	15–30	6.3–20.0	0.09–0.11	5.6–6.0	Very low	Low to moderate.	Moderate.
80–100	50–70	0–15	6.3–20.0	0.05–0.10	5.6–6.0	Very low.		
80–100	50–80	0–15	6.3–20.0	0.05–0.10	5.1–6.5	Very low	Low	Moderate to high.
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 5.6–7.3	Low	Low to moderate.	Moderate.
100	95–100	95–100	0.63–2.0	0.20–0.22	5.1–5.5	Moderate.		
100	95–100	80–100	0.63–2.0	0.20–0.22	5.1–5.5	Low.		
100	85–95	50–60	0.63–2.0	0.20–0.22	5.1–5.5	Low	High	High.
100	85–95	50–60	0.63–2.0	0.17–0.19	4.6–5.0	Low.		
100	65–80	0–15	6.3–20.0	0.05–0.10	4.6–5.0	Very low.		
100	65–80	15–20	>20.0	0.10–0.12	5.1–5.5	Very low	Low	High.
100	50–70	0–5	>20.0	0.05–0.07	5.1–5.5	Very low.		
100	75–90	15–20	6.3–20.0	0.10–0.12	5.1–5.5	Very low	Low to moderate.	High.
100	50–70	0–5	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		
90–100	65–95	30–95	6.3–20.0	0.13–0.24	6.6–7.3	Low	Moderate	High.
100	65–80	15–20	6.3–20.0	0.10–0.12	5.1–5.5	Very low	Low	High.
100	50–70	0–5	6.3–20.0	0.05–0.07	5.1–5.5	Very low.		

TABLE 5.—*Estimated soil properties*

Soil series and map symbols	Depth to—		Depth from surface	Dominant USDA texture	Classification	
	Bedrock	Seasonal high water table			Unified	AASHO
	Feet	*Feet*	*Inches*			
Trempealeau: TuA	>5	>5	0–11	Loam	SM or ML	A–4
			11–25	Loam	SM or ML	A–4
			25–60	Sand	SP–SM	A–3
Trempealeau, mottled subsoil variant: TvA	>5	1–3	0–12	Loam	ML	A–4
			12–32	Sandy loam	SM	A–4
			32–60	Sand	SP–SM	A–3
*Urne: UfB, UfC2, UfD2, UfE2, UfF, UnC2, UnD2, UnE2, UrD2, UrE, UrF. For Norden part of UrD2, UrE, and UrF, see Norden series.	2–3	>5	0–12	Silt loam	ML	A–4
			12–30	Very fine sandy loam	ML	A–4
			30–60	Soft standstone.[3]		
Wallkill: WaA	>5	0–2	0–24	Silt loam	ML	A–4
			24–60	Muck	Pt	([6])
Wet alluvial land: We	>5	0–1	0–60	Loam to sand	SP, ML, or SM	A–3, A–2, A–4
Whitehall: WhA	>5	4–6+	0–12	Silt loam	ML	A–4
			12–36	Silty clay loam	ML or CL	A–4
			36–60	Sand	SP–SM	A–3
Worthen: WoA	>5	>5	0–34	Silt loam	ML or CL	A–6
			34–60	Silt loam	ML or CL	A–4 or A–6

[1] Corrosivity estimate applies to the entire profile, not a particular layer.
[2] Estimate based on a limed soil.
[3] See "Descriptions of the Soils" for information about kind of underlying rock.

limitation or suitability of the soils for all listed purposes other than for drainage of cropland and pasture, irrigation, ponds and reservoirs, embankments, terraces and diversions, and grassed waterways. For these particular uses, table 6 lists those soil features not to be overlooked in planning, installation, and maintenance.

Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* means soil properties are generally favorable for the rated use, or in other words, limitations are minor and easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* means soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance. For some uses, the rating of severe is divided to obtain ratings of severe and very severe. Very severe means one or more soil properties is so unfavorable for a particular use that overcoming the limitations is most difficult and costly and commonly not practical for the rated use.

Soil suitability is rated by the terms *good, fair,* and *poor,* which have, respectively, meanings approximately parallel to the terms slight, moderate, and severe.

Following are explanations of some of the columns in table 6.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 5 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

significant to engineering—Continued

Percentage less than 3 inches passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential	Corrosivity [1]	
No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.074 mm)					Uncoated steel	Concrete
			Inches per hour	*Inches per inch of soil*	*pH*			
100	85–95	45–55	0.63–2.0	0.20–0.22	[2] 6.1–7.3	Low	Moderate	Moderate.
100	85–95	45–55	0.63–2.0	0.17–0.19	5.1–5.5	Low.		
100	50–70	5–10	6.3–20.0	0.05–0.07	5.6–6.0	Very low.		
100	85–95	50–70	0.63–2.0	0.20–0.22	[2] 6.6–7.3	Low	Moderate	Moderate.
80–100	60–70	35–45	0.63–2.0	0.12–0.14	5.1–5.5	Low.		
80–100	50–70	5–10	6.3–20.0	0.05–0.07	5.6–6.0	Very low.		
100	90–100	60–80	0.63–2.0	0.20–0.22	5.6–7.3	Low	Low	Low.
100	85–95	50–60	0.63–2.0	0.17–0.19	6.1–6.5	Low.		
100	90–100	80–100	0.63–2.0	0.22–0.24	7.4–7.8	Low	High	Low.
([5])	([5])	([5])	2.0–6.3	0.25–0.35	7.4–7.8	Low.		
100	85–95	0–60	0.63–20.0	0.05–0.22	6.1–7.8	Low.		
100	95–100	90–100	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Low	Moderate	Moderate to high.
90–100	80–95	70–90	0.63–2.0	0.18–0.20	4.5–6.0	Moderate.		
90–100	50–70	5–10	0.63–2.0	0.05–0.07	4.5–5.0	Very low.		
100	90–100	85–95	0.63–2.0	0.22–0.24	[2] 6.6–7.3	Low	Moderate	Low.
100	90–100	85–95	0.63–2.0	0.20–0.22	6.1–6.5	Low.		

[1] Seasonal perched water table.
[5] Not applicable to the soil.

Sewage lagoons are shallow ponds constructed to hold sewage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slope, and if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet, as for example, excavations for pipelines, sewerlines, phone and power transmission lines, basements, open ditches, and cemeteries. Desirable soil properties are good workability, moderate resistance to sloughing, gentle slopes, absence of rock outcrop or big stones, and freedom from flooding or a high water table.

Dwellings, as rated in table 6, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under load and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks.

Sanitary landfill is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of

TABLE 6.—*Interpretations of*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The instructions for referring to other series that

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Billett: BlA, BlB	Slight [3]	Severe: rapid permeability in substratum.	Moderate: sidewall instability in substratum.	Slight	Severe: rapid permeability in sandy substratum.[3]	Slight	Good
BlC2	Moderate: [3] slope.	Severe: rapid permeability in substratum.	Moderate: sidewall instability in substratum.	Moderate: slope.	Severe: rapid permeability in sandy substratum.[3]	Moderate: slope.	Good
BlD2	Severe: [3] slope.	Severe: rapid permeability in substratum.	Moderate: sidewall instability in substratum.	Severe	Severe: rapid permeability in sandy substratum.[3]	Severe: slope.	Fair: slope.
Boaz: BmA	Severe: [3] seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: high frost-action potential.	Poor: high frost-action potential.
Boone: BnB, BnC2, BnE2.	Severe: sandstone at a depth of 2 to 4 feet.	Severe: rapid permeability.	Severe: standstone at a depth of 2 to 4 feet.	Severe: sandstone at a depth of 2 to 4 feet.	Severe: sandstone at a depth of 2 to 4 feet.	Moderate: sandstone at a depth of 2 to 4 feet.	Poor: sandstone at a depth of 2 to 4 feet.
Denrock: Dc	Severe: slow permeability.	Moderate: seasonal perched water table.	Severe: difficult to work.	Severe: seasonal perched water table; high shrink-swell potential.	Severe: seasonal perched water table.	Severe: high shrink-swell potential.	Poor: high shink-swell potential.
Denrock, wet subsoil variant: De.	Severe: seasonal perched water table; slow permeability.	Severe: seasonal perched water table.	Severe: difficult to work.	Severe: seasonal perched water table; high shrink-swell potential.	Severe: seasonal perched water table.	Severe: seasonal perched water table.	Poor: seasonal perched water table.

See footnotes at end of table.

engineering properties of the soils

soils in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the appear in the first column of this table]

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Good	Good	Rapid permeability.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; moderately rapid water-intake rate.	[6]	Low fertility; low available water capacity.
Good	Good	Rapid permeability; slope.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; moderately rapid water-intake rate.	Sand at a depth of 2 to 4 feet.	Low fertility; low available water capacity.
Fair: slope	Fair: slope	Rapid permeability.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; moderately rapid water-intake rate.	Sand at a depth of 2 to 4 feet.	Low fertility; low available water capacity.
Unsuited: no sand.	Poor: borrow area wet; revegetation difficult.	Moderate permeability; seasonal high water table.	Low permeability; medium to low shear strength.	Seasonal high water table; moderate permeability.	High available water capacity; seasonal high water table; moderate water-intake rate.	Seasonally wet; nearly level to gently sloping.	Seasonally wet; nearly level to gently sloping.
Poor: sandstone at a depth of 2 to 4 feet.	Poor: sandy; droughty.	Sandstone at a depth of 2 to 4 feet.	High piping hazard; high permeability.	Excessively drained.	Very low available water capacity; rapid water-intake rate; steep in most places.	Sandy soil over sandstone bedrock.	Low fertility; very low available water capacity.
Poor: seasonal perched water table; sand at a depth near 4 feet.	Poor: borrow area clayey and wet; revegetation difficult.	Slow permeability; seasonal perched water table.	Low permeability; low piping hazard; medium to low shear strength.	Seasonal perched water table; slow permeability.	High available water capacity; seasonal perched water table.	Seasonally wet; nearly level; clayey subsoil.	Seasonally wet; nearly level.
Poor: seasonal perched water table; sand at a depth near 4 feet.	Poor: seasonal perched water table.	Slow permeability; seasonal perched water table.	Low permeability; low piping hazard; medium to low shear strength.	Seasonal perched water table; slow permeability.	High available water capacity; perched water table.	Wet; nearly level.	Wet; nearly level.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Dickinson: DkA, DkB, DlA.	Slight [3]	Severe: rapid permeability in substratum.	Moderate: sidewall instability in substratum.	Slight	Severe: rapid permeability in substratum.[3]	Slight	Good
Downs:							
DoA, DoB	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight	Slight	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
DoC2	Moderate: slope; moderate permeability.	Moderate: slope; moderate permeability.	Moderate: slope.	Moderate: slope.	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
DoD2	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: high frost-action potential.	Poor: high frost-action potential.
Dunnville:							
DuA, DuB	Slight [3]	Severe: rapid permeability in substratum.	Moderate: sidewall instability.	Slight	Severe: rapid permeability in substratum.[3]	Slight	Good
DuC	Moderate: [3] slope.	Severe: rapid permeability in substratum.	Moderate: sidewall instability.	Moderate: slope.	Severe: rapid permeability in substratum.[3]	Moderate: slope.	Good
*Eleva:							
ElB2	Severe: sandstone at a depth of 4 to 5 feet.[5]	Severe: sandstone at a depth of 4 to 5 feet.	Moderate: sandstone at a depth of 4 to 5 feet.	Moderate: sandstone at a depth of 4 to 5 feet.	Severe: sandstone at a depth of 4 to 5 feet.	Slight	Fair: sandstone at a depth of 4 to 5 feet.
ElC2	Severe: sandstone at a depth of 3 to 5 feet.	Severe: sandstone at a depth of 3 to 5 feet.	Moderate: sandstone at a depth of 3 to 5 feet; slope.	Moderate: sandstone at a depth of 3 to 5 feet.	Severe: sandstone at a depth of 3 to 5 feet.	Moderate: slope.	Fair: sandstone at a depth of 3 to 5 feet.
ElD2, ElE2, EnF, EoE. For Boone part of EnF, see Boone series; for Gale part of EoE, see Gale series.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope.	Poor: sandstone at a depth of 2 to 4 feet; slope.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Good	Good	Rapid permeability.	Medium permeability; medium to high piping hazard.	Well drained	Low available water capacity; moderately rapid water-intake rate.	Sand at a depth of 2 to 4 feet; nearly level to gently sloping.	Low fertility; low available water capacity.
Unsuited: no sand.	Good	Moderate permeability.	Medium to high piping hazard; medium to low shear strength.	Well drained	High available water capacity; moderate water-intake rate.	Nearly level to gently sloping.	Nearly level to gently sloping.
Unsuited: no sand.	Fair: slope; erosion hazard.	Moderate permeability; slope.	Medium to high piping hazard; medium to low shear strength.	Well drained	High available water capacity; moderate water-intake rate.	Many short, uneven slopes.	Moderate erosion hazard.
Unsuited: no sand.	Poor: slope; erosion hazard.	Moderate permeability; slope.	Medium to high piping hazard; medium to low shear strength.	Well drained	High available water capacity; moderate water-intake rate.	Many short, uneven slopes.	Severe erosion hazard.
Good	Good	Rapid permeability.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; moderately rapid water-intake rate.	[4]	Low fertility; low available water capacity.
Good	Good	Rapid permeability.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; moderately rapid water-intake rate.	Sand at a depth of 2 to 4 feet.	Low fertility; low available water capacity.
Poor: sandstone at a depth of 4 to 5 feet.	Good	Sandstone bedrock at a depth of 4 to 5 feet.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; moderately rapid water-intake rate.	[4]	Low fertility: low available water capacity.
Poor: sandstone at a depth of 3 to 5 feet.	Fair: slope; erodible.	Sandstone bedrock at a depth of 3 to 5 feet.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; slope.	Short, uneven slopes.	Low fertility: low available water capacity.
Poor: sandstone at a depth of 2 to 4 feet.	Poor: slope; erodible.	Slope; sandstone at a depth of 2 to 4 feet.	Medium to high piping hazard; medium shear strength.	Well drained	Low available water capacity; slope.	Short, uneven slopes.	Slope: severe to very severe erosion hazard.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Ettrick: Er	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: high frost-action potential.	Poor: high frost-action potential.
Ettrick, clayey subsoil variant: Et.	Severe: moderately slow permeability in subsoil; seasonal perched water table.	Severe: rapid permeability in substratum.	Severe: seasonal perched water table; difficult to work.	Severe: seasonal perched water table; high shrink-swell potential.	Severe: seasonal perched water table;	Severe: high shrink-swell potential.	Poor: high shrink-swell potential.
Fayette:							
FaB	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight	Slight	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
FaC, FaC2	Moderate: slope; moderate permeability.	Severe: slope.	Moderate: slope.	Moderate: slope.	Slight	Severe: high frost-action potential.	Poor: high frost-action potential.
FaD, FaD2, FaD3, FaE.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Moderate for FaD, FaD2, and FaD3; severe for FaE; slope.	Severe: high frost-action potential; slope.	Poor: high frost-action potential; slope.
Gale:							
GaB	Severe: sandstone at a depth of 3 to 5 feet. [6]	Severe: sandstone bedrock at a depth of 3 to 5 feet.	Moderate: sandstone at a depth of 3 to 5 feet.	Moderate: sandstone at a depth of 3 to 5 feet.	Severe: sandstone at a depth of 3 to 5 feet.	Severe: high frost-action potential.	Poor: high frost-action potential.
GaC, GaC2	Severe: sandstone at a depth of 3 to 5 feet.	Severe: sandstone bedrock at a depth of 3 to 5 feet; slope.	Moderate: sandstone at a depth of 3 to 5 feet; slope.	Moderate: sandstone at a depth of 3 to 5 feet.	Severe: sandstone at a depth of 3 to 5 feet.	Severe: high frost-action potential.	Poor: high frost-action potential.
GaD, GaD2	Severe: slope; sandstone at a depth of 3 to 5 feet.	Severe: slope; sandstone at a depth of 3 to 5 feet.	Severe: slope; sandstone at a depth of 3 to 5 feet.	Severe: slope; sandstone at a depth of 3 to 5 feet.	Severe: slope; sandstone at a depth of 3 to 5 feet.	Severe: slope; high frost-action potential.	Poor: high frost-action potential.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Unsuited: no sand.	Poor: borrow area wet; revegetation difficult.	Moderately slow permeability; seasonal high water table.	Low permeability; medium to low shear strength.	Seasonal high water table; moderately slow permeability.	High available water capacity; seasonal high water table.	Seasonally wet; nearly level.	Seasonally wet; nearly level.
Poor: seasonal perched water table; clayey subsoil; sandy substratum.	Poor: borrow area wet and clayey; revegetation difficult.	Moderately slow permeability in subsoil; seasonal perched water table.	Low permeability; medium to low shear strength; high compressibility.	Seasonal perched water table; moderately slow permeability.	High available water capacity; moderately slow water-intake rate.	Seasonally wet; nearly level.	Seasonally wet; nearly level.
Unsuited: no sand.	Good	Moderate permeability.	Low permeability; medium to low shear strength.	Well drained	High available water capacity; moderate water-intake rate.	[4]	Silty; slight erosion hazard.
Unsuited: no sand.	Fair: slope	Moderate permeability.	Low permeability; medium to low shear strength.	Well drained	High available water capacity; moderate water-intake rate; slope.	Short, uneven slopes.	Silty; slope; moderate erosion hazard.
Unsuited: no sand.	Poor: slope	Moderate permeability.	Low permeability; medium to low shear strength.	Well drained	High available water capacity; moderate water-intake rate; slope.	Short, uneven slopes.	Silty; slope; severe to very severe erosion hazard.
Poor: sandstone at a depth of 3 to 5 feet.	Good	Sandstone at a depth of 3 to 5 feet.	Medium to low permeability; medium to low shear strength.	Well drained	Medium available water capacity; moderate water-intake rate.	Sandstone at a depth of 3 to 5 feet.	Silty; slight erosion hazard.
Poor: sandstone at a depth of 3 to 5 feet.	Fair: slope; erodible.	Sandstone at a depth of 3 to 5 feet.	Medium to low permeability; medium to low shear strength.	Well drained	Medium available water capacity; moderate water-intake rate; slope.	Short, uneven slopes; sandstone at a depth of 3 to 5 feet.	Silty; moderate erosion hazard.
Poor: sandstone at a depth of 3 to 5 feet.	Poor: slope; erodible.	Slope; sandstone at a depth of 3 to 5 feet.	Medium to low permeability; medium to low shear strength.	Well drained	Medium available water capacity; moderate water-intake rate; slope.	Short, uneven slopes; underlain by sandstone.	Silty; severe and very severe erosion hazard.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
GIC2, GID2, GIE2.	Severe: sandstone at a depth of about 2 feet; slope.	Severe: sandstone at a depth of about 2 feet; slope.	Severe: sandstone at a depth of about 2 feet.	Severe: sandstone at a depth of about 2 feet.	Severe: sandstone at a depth of about 2 feet.	Moderate: sandstone at a depth of about 2 feet.	Poor: sandstone at a depth of about 2 feet.
*Gotham: GoA, GoB	Slight [3]	Severe: rapid permeability.	Severe: sidewall instability.	Slight	Severe: poor trafficability.[3]	Slight	Good
GoC	Moderate: [3] slope	Severe: rapid permeability; slope.	Severe: sidewall instability.	Moderate: slope.	Severe: poor trafficability; rapid permeability.[3]	Moderate: slope.	Good
GoD2, GpD For Sparta part of GpD, see Sparta series.	Severe: slope.	Severe: rapid permeability; slope.	Severe: sidewall instability; slope.	Severe: slope.	Moderate: slope; poor trafficability.[3]	Severe: slope.	Good
Gullied land: Gu. No interpretations; limitations severe for most uses.							
Hixton: HnB2	Severe: weakly cemented sandstone at a depth of 3 to 5 feet.[5]	Severe: weakly cemented sandstone at a depth of 3 to 5 feet.	Moderate: weakly cemented sandstone at a depth of 3 to 5 feet.	Moderate: weakly cemented sandstone at a depth of 3 to 5 feet.	Severe: weakly cemented sandstone at a depth of 3 to 5 feet.	Severe: high frost-action potential.	Poor: high frost-action potential.
HnC2	Severe: sandstone at a depth of 3 to 5 feet; slope.	Severe: sandstone at a depth of 3 to 5 feet.	Moderate: sandstone at a depth of 3 to 5 feet.	Moderate: sandstone at a depth of 3 to 5 feet.	Severe: sandstone bedrock.	Severe: high frost-action potential.	Poor: high frost-action potential.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [a]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Poor: sandstone at a depth of about 2 feet.	Poor: sandstone in borrow areas; difficult to revegetate.	Sandstone at a depth of about 2 feet; slope.	Sandstone at a depth of about 2 feet.	Well drained	Sandstone at a depth of about 2 feet.	Sandstone at a depth of about 2 feet.	Slope; moderate to very severe erosion hazard.
Good	Poor: sandy	Rapid permeability.	Medium to high piping hazard; fair to good compaction characteristics; medium shear strength.	Somewhat excessively drained.	Low available water capacity; rapid water-intake rate; nearly level to gently sloping.	[c]	Low fertility; low available water capacity.
Good	Poor: sandy	Rapid permeability.	Medium to high piping hazard; fair to good compaction characteristics; medium shear strength.	Somewhat excessively drained.	Low available water capacity; rapid water-intake rate; slope.	[c]	Low fertility; low available water capacity; moderate erosion hazard.
Good	Poor: sandy	Rapid permeability.	Medium to high piping hazard; fair to good compaction characteristics; medium shear strength.	Somewhat excessively drained.	Low available water capacity; rapid water-intake rate; slope.	[c]	Low fertility; low available water capacity; severe to very severe erosion hazard.
Poor: weakly cemented sandstone at a depth of 3 to 5 feet.	Good	Weakly cemented sandstone at a depth of 3 to 5 feet.	Medium to low permeability; high piping hazard.	Well drained	Moderate available water capacity; moderate water-intake rate.	Weakly cemented sandstone at a depth of 3 to 5 feet.	Slight erosion hazard; moderate available water capacity.
Poor: sandstone at a depth of 3 to 5 feet.	Fair: slope; erodible.	Sandstone at a depth of 3 to 5 feet.	Medium to low permeability; high piping hazard.	Well drained	Moderate available water capacity; moderate water-intake rate; slope.	Sandstone at a depth of 3 to 5 feet.	Moderate erosion hazard; moderate available water capacity.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill[1]	Local roads and streets	Road fill
HnD2, HnE2, HnF.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: slope; sandstone at a depth of 2 to 4 feet.	Severe: sandstone at a depth of 2 to 4 feet; slope of HnE2 and HnF.	Severe: slope; high frost-action potential.	Poor: high frost-action potential.
Houghton: Ho	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table; high compressibility.	Poor: high water table; high compressibility.
Huntsville: HuA	Severe: subject to occasional shallow flooding.	Moderate: medium low permeability when compacted.	Severe: subject to occasional shallow flooding.	Severe: subject to occasional shallow flooding	Severe: subject to occasional shallow flooding.	Severe: subject to occasional shallow flooding; high frost-action potential.	Poor: high frost-action potential.
Kato, sandy loam variant: Ka.	Severe: seasonal high water table.	Severe: rapid permeability in substratum.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Poor: seasonal high water table.
Kato: KcA	Severe: seasonal high water table.	Severe: rapid permeability in substratum.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; high frost-action potential.	Poor: seasonal high water table; high frost-action potential.
La Farge: LfB2	Severe: soft, shaly sandstone at a depth of 4 to 5 feet.[5]	Severe: moderate permeability and seepage in substratum; soft, shaly sandstone at a depth of 4 to 5 feet.	Moderate: soft, shaly sandstone at a depth of 4 to 5 feet.	Moderate: soft, shaly sandstone at a depth of 4 to 5 feet.	Severe: soft, shaly sandstone at a depth of 4 to 5 feet.	Severe: silty; high frost-action potential.	Fair in soft, shaly sandstone; poor in silty part above sandstone; high frost-action potential.
LfC2	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Moderate: soft, shaly sandstone at a depth of 2 to 4 feet.	Moderate: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: silty; high frost-action potential.	Fair in soft, shaly sandstone; poor in silty part above sandstone; high frost-action potential.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Poor: sandstone at a depth of 2 to 4 feet.	Poor: slope; erodible.	Slope; sandstone at a depth of 2 to 4 feet.	Medium to low permeability; high piping hazard.	Well drained	Moderate available water capacity; moderate water-intake rate; slope.	Sandstone at a depth of 2 to 4 feet.	Severe to very severe erosion hazard; moderate available water capacity.
Poor: sand below a depth of 50 inches in some areas; high water table.	Poor: high water table; muck.	High water table; moderately rapid permeability.	High compressibility; low shear strength.	Very poorly drained; moderately rapid permeability.	High water table.	Severe hazard of soil blowing; low shear strength.	High water table.
Poor: bands of sand in substratum in some areas.	Good	Subject to occasional shallow flooding; moderate permeability.	Medium to low permeability; high organic-matter content; good to fair compaction characteristics.	Well drained to moderately well drained.	Very high available water capacity.	Nearly level to gently sloping drainageways; subject to occasional flooding and siltation.	Nearly level to gently sloping; subject to occasional shallow flooding.
Fair: sandy substratum; seasonal high water table.	Poor: seasonal high water table.	Seasonal high water table; rapid permeability in substratum.	Medium to high permeability; medium to high piping hazard.	Poorly drained; some outlets filled or partly blocked.	Seasonal high water table.	Seasonal high water table; subject to occasional flooding and siltation.	Nearly level; subject to occasional shallow flooding.
Fair: sandy substratum; seasonal high water table.	Poor: seasonal high water table; borrow areas difficult to revegetate.	Seasonal high water table; moderate permeability in subsoil; rapid permeability in substratum.	Low permeability in compacted subsoil; high permeability in compacted substratum.	Poorly drained.	Seasonal high water table.	Seasonal high water table; subject to occasional flooding.	Nearly level to gently sloping; subject to occasional flooding.
Poor: soft, shaly sandstone at a depth of 4 to 5 feet.	Good	Moderate permeability and seepage in substratum; soft, shaly sandstone at a depth of 4 to 5 feet.	Medium to low permeability; fair to good compaction characteristics.	Well drained	Moderate available water capacity; moderate water-intake rate.	Gently sloping; soft, shaly sandstone at a depth of 4 to 5 feet.	Silty; slight erosion hazard.
Poor: soft, shaly sandstone at a depth of 2 to 4 feet.	Fair: slope; erodible.	Soft, shaly sandstone at a depth of 2 to 4 feet; slope.	Medium to low permeability; fair to good compaction characteristics.	Well drained	Moderate available water capacity; moderate water-intake rate.	Short, irregular slopes; soft, shaly sandstone at a depth of 2 to 4 feet.	Silty; severe to very severe erosion hazard.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
LfD2, LfE, LfE2	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Fair in soft, shaly sandstone; poor in silty part above sandstone; high frost-action potential.
Lawson: LsA	Severe: seasonal high water table; occasional shallow flooding.	Moderate: moderate permeability; seasonal high water table; occasional shallow flooding.	Severe: seasonal high water table; subject to occasional shallow flooding.	Severe: seasonal high water table; occasional shallow flooding.	Severe: seasonal high water table; subject to occasional shallow flooding.	Severe: subject to occasional shallow flooding; high frost-action potential.	Poor: subject to occasional shallow flooding; silty; high frost-action potential.
Loamy alluvial land: Lv.	Severe: subject to frequent flooding; seasonal high water table.	Severe: subject to frequent flooding; seasonal high water table.	Severe: subject to frequent flooding; seasonal high water table.	Severe: subject to frequent flooding; seasonal high water table.	Severe: subject to frequent flooding; seasonal high water table.	Severe: subject to frequent flooding; seasonal high water table.	Poor: seasonal high water table; silty; high frost-action potential.
Loamy terrace escarpments: Lx.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Fair to poor: variable with depth; slope.
Marsh: Ma. No interpretations; limitations severe for most uses.							
Meridian: MdA, MdB	Slight: rapid permeability in substratum.[3]	Severe: rapid permeability in substratum.	Moderate: sidewall instability in substratum.	Slight	Severe: rapid permeability in sandy substratum.[3]	Moderate: moderate to moderately high frost-action potential.	Good: sandy substratum.
MdC2	Moderate: [3] slope.	Severe: rapid permeability in substratum; slope.	Moderate: sidewall instability in substratum; slope.	Moderate: slope.	Severe: rapid permeability in sandy substratum.[3]	Moderate: moderate to moderately high frost-action potential; slope.	Good: sandy substratum.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Poor: soft, shaly sandstone at a depth of 2 to 4 feet.	Poor: slope; erodible.	Slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Medium to low permeability; fair to good compaction characteristics.	Well drained	Moderate available water capacity; moderate water-intake rate; slope.	Short, irregular slopes; shaly sandstone at a depth of 2 to 4 feet.	Silty; moderate erosion hazard.
Unsuited: no sand.	Fair: revegetation difficult in deep wet borrow areas.	Moderate permeability; seasonal high water table; subject to occasional and shallow flooding.	Medium to low permeability; medium to high piping hazard.	Somewhat poorly drained.	Very high available water capacity; subject to occasional shallow flooding.	Nearly level to gently sloping; subject to occasional shallow flooding.	Slight erosion hazard; subject to occasional shallow flooding.
Fair: variable, but sand at a depth of 3 to 10 feet in most areas.	Fair to good: variable.	Subject to frequent flooding; seasonal high water table; moderate permeability.	Medium to low permeability; medium to high piping hazard.	Moderately well drained to somewhat poorly drained.	Medium to high available water capacity; subject to frequent flooding.	Nearly level; subject to frequent flooding.	Mainly silt and loam sediments; subject to frequent flooding.
Fair to poor: variable, but sand common in substratum; slope.	Poor: moderately steep to very steep; erodible.	Moderately steep to very steep.	Generally medium to low permeability, but ranges to high in sandy substratum.	Well drained	Moderately steep to very steep; slope.	Moderately steep to very steep; short slopes.	Loamy in upper part; severe to very severe erosion hazard.
Good: sandy substratum.	Good	Rapid permeability in substratum.	Generally medium to low permeability, but ranges to high in sandy substratum.	Well drained	Moderate available water capacity; moderate water-intake rate.	Nearly level to gently sloping; sand at a depth of 2 to 5 feet.	Loamy; slight erosion hazard.
Good: sandy substratum.	Fair: slope; erodible.	Rapid permeability in substratum.	Generally medium to low permeability, but ranges to high in sandy substratum.	Well drained	Moderate available water capacity; moderate water-intake rate; slope.	Short, irregular slopes; sand at a depth of 2 to 3 feet.	Loamy; moderate erosion hazard.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Morocco: MoA	Severe: seasonal high water table.[2]	Severe: rapid permeability.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.[3]	Moderate: seasonal high water table; sandy.	Fair: seasonal high water table.
Muscatine: MuA	Severe: seasonal high water table.	Moderate: moderate permeability.	Severe: seasonal high water table.	Severe: seasonal high water table; high shrink-swell potential.	Severe: seasonal high water table.	Severe: seasonal high water table; high frost-action potential.	Poor: high shrink-swell potential; high frost-action potential.
Norden: NoC2, NrB2, NrC2.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: high frost-action potential.	Fair in soft, shaly sandstone, poor in loamy part above sandstone; high frost-action potential.
NoD2, NrD2, NrE2.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: soft, shaly sandstone at a depth of 2 to 4 feet.	Severe: slope; high frost-action potential.	Fair in soft, shaly sandstone; poor in loamy part above sandstone; high frost-action potential.
Palms: Pa	Severe: high water table.	Severe: high water table; moderately rapid permeability.	Severe: high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table; high organic-matter content.	Unsuited: high organic-matter content.
Palsgrove: PgB, PgC2, PgD2.	Severe: moderately slow permeability in clay substratum.	Moderate for PgB; severe for PgC2 and PgD2: slope; 4 to 8 feet of clay over dolomitic limestone.	Severe: clay texture.	Severe: high shrink-swell potential.	Severe: clay over fissured dolomitic limestone.	Severe: high shrink-swell and frost-action potential; slope.	Poor: high shrink-swell and frost-action potential.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Fair: seasonal high water table.	Poor: sandy.	Rapid permeability; seasonal high water table.	High permeability; high piping hazard.	Somewhat poorly drained.	Low available water capacity; rapid water-intake rate; seasonal high water table.	Sandy; seasonal high water table.	Sandy; seasonal high water table.
Unsuited: no sand.	Fair: revegetation difficult in deep, wet borrow areas.	Moderate: permeability; seasonal high water table.	Low permeability; fair to good compaction characteristics; medium to low shear strength.	Somewhat poorly drained.	High available water capacity; moderate to moderately slow water-intake rate.	Nearly level to gently sloping; seasonal high water table.	Silty; seasonal high water table.
Poor: soft, shaly sandstone at a depth of 2 to 4 feet.	Good for NrB2, fair for NoC2 and NrC2: slope; erodible.	Soft, shaly sandstone at a depth of 2 to 4 feet.	Medium to low permeability; medium to low shear strength.	Well drained	Moderate available water capacity; moderate water-intake rate.	Soft, shaly sandstone at a depth of 2 to 4 feet.	Erosion hazard slight on NrB2 and moderate on NoC2 and NrC2.
Poor: soft, shaly sandstone at a depth of 2 to 4 feet.	Poor: slope; erodible.	Soft, shaly sandstone at a depth of 2 to 4 feet.	Medium to low permeability; medium to low shear strength.	Well drained	Moderate available water capacity; moderate water-intake rate.	Soft, shaly sandstone at a depth of 2 to 4 feet; short, irregular slopes.	Silty; severe erosion hazard.
Unsuited: high organic-matter content; high water table.	Poor: high organic-matter content; high water table.	Moderately rapid permeability; high water table.	High organic-matter content.	Poorly drained.	Very high available water capacity; moderately rapid water-intake rate; high water table.	Nearly level; high organic-matter content; high water table.	Nearly level; high water table.
Unsuited: no sand but source of limestone for crushing.	Fair for PgB; severe for PgB, PgC2 and PgD2; silty clay loam at a depth of about 12 inches; slope.	Moderately slow permeability; fissured dolomitic limestone at a depth of 4 to 8 feet.	Low permeability; medium to low shear strength.	Well drained	High available water capacity; moderate to moderately slow water-intake rate.	Clay substratum at a depth of about 38 inches.	Erosion hazard slight on PgB; moderate on PgC2; and severe on PgD2.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Palsgrove, clayey subsoil variant: PlB, PlC, PlD, PlD2, PlE, PnD3.	Severe: moderately slow permeability.	Moderate for PlB; severe for PlC, PlD, PlD2, PnD3, and PnE: slope; 4 to 8 feet of clay over dolomitic limestone.	Severe: clay texture.	Severe: high shrink-swell potential.	Severe: clay over fissured dolomitic limestone.	Severe: high shrink-swell and frost-action potential.	Poor: high shrink-swell and frost-action potential.
Pillot: PoA, PoB	Slight: rapid permeability in substratum.[3]	Severe: rapid permeability in substratum.	Moderate: sidewall instability in substratum.	Slight	Severe: rapid permeability in sandy substratum.[3]	Severe: high frost-action potential.	Good in sandy substratum; poor in upper silty part; high frost-action potential.
PoC2	Moderate: slope; rapid permeability in substratum.[3]	Severe: slope; rapid permeability in substratum.	Moderate: sidewall instability in substratum; slope.	Moderate: slope.	Severe: rapid permeability in sandy substratum.[3]	Severe: high frost-action potential.	Good in sandy substratum; poor in upper silty part; high frost-action potential.
Port Byron: PrB	Slight	Severe: slope; moderate permeability.	Slight	Slight	Slight	Severe: high frost-action potential.	Poor: silty; high frost-action potential.
PrC2	Moderate: slope.	Severe: slope; moderate permeability.	Moderate: slope.	Moderate: slope.	Slight	Severe: high frost-action potential.	Poor: silty; high frost-action potential.
PrD2, PrE	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Moderate for PrD2; severe for PrE; slope.	Severe: slope.	Poor: silty; high frost-action potential.
Sandy alluvial land: Sa.	Severe: subject to frequent flooding.[3]	Severe: rapid permeability; subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Severe: sandy; subject to flooding.[3]	Severe: subject to flooding.	Fair: sandy; subject to flooding; seasonal high water table.
Sandy terrace escarpments: Sd.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep;	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Severe: moderately steep to very steep.	Fair: sandy; moderately steep to very steep.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Unsuited: no sand but source of limestone for crushing.	Poor: clayey.	Moderately slow permeability; fissured dolomitic limestone at a depth of 4 to 8 feet.	Low permeability; high compressibility; low shear strength.	Well drained.	Moderate available water capacity; moderately slow water-intake rate.	Clay subsoil at a depth of about 15 inches.	Erosion hazard slight on PIB; moderate on PIC; and severe on others.
Good: sandy substratum.	Good	Rapid permeability in substratum.	Medium to low permeability but ranges to high in sandy substratum.	Well drained.	Moderate available water capacity; moderate water-intake rate.	Nearly level to gently sloping; sand at a depth of 2 to 3 feet.	Silty; slight erosion hazard.
Good: sandy substratum.	Fair: slope.	Rapid permeability in substratum.	Medium to low permeability but ranges to high in sandy substratum.	Well drained.	Moderate available water capacity; moderate water-intake rate.	Sloping; sand at a depth of 2 to 3 feet.	Silty; moderate erosion hazard.
Unsuited: no sand.	Good	Moderate permeability.	Medium to low permeability; medium to high piping hazard.	Well drained.	Very high available water capacity; moderate water-intake rate.	Gently sloping; deep silt.	Silty; slight erosion hazard.
Unsuited: no sand.	Fair: slope; erodible.	Moderate permeability.	Medium to low permeability; medium to high piping hazard.	Well drained.	Very high available water capacity; moderate water-intake rate.	Sloping; deep silt.	Silty; moderate erosion hazard.
Unsuited: no sand.	Severe: slope; erodible.	Moderate permeability.	Slope: medium to low permeability; medium to high piping hazard.	Well drained.	Slope; very high available water capacity; moderate water-intake rate.	Moderately steep to steep; deep silt.	Silty; severe to very severe erosion hazard.
Fair: stratified sand; seasonal high water table.	Poor: sandy.	Rapid permeability; seasonal high water table.	High permeability; medium to high piping hazard.	Well drained to moderately well drained.	Low available water capacity; rapid water-intake rate.	Nearly level; sandy.	Sandy; hazard of streambank erosion.
Good in most places; fair or poor in a few places: variable.	Poor: sandy; moderately steep to very steep; erodible.	Rapid permeability; moderately steep to very steep.	High permeability; medium to high piping hazard.	Excessively drained.	Moderately steep to very steep; low available water capacity; rapid water-intake rate.	Moderately steep to very steep; sandy; hazard of gully erosion.	Sandy; severe to very severe hazard of soil blowing; hazard of gully erosion.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill[1]	Local roads and streets	Road fill
Seaton: SeB	Slight	Moderate: slope; moderate permeability.	Slight	Slight	Slight	Severe: high frost-action potential.	Poor: silty; high frost-action potential.
SeC, SeC2	Moderate: slope.	Severe: slope; moderate permeability.	Moderate: slope.	Moderate: slope.	Slight	Severe: high frost-action potential.	Poor: silty; high frost-action potential.
SeD2, SeE, SeE2	Severe: slope.	Severe: slope; moderate permeability.	Severe: slope.	Severe: slope.	Moderate for SeD2; severe for SeE and SeE2; slope.	Severe: slope; high frost-action potential.	Poor: silty; high frost-action potential.
Shiffer: ShA	Severe: seasonal high water table.	Severe: rapid permeability in substratum; seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: rapid permeability in sandy substratum; seasonal high water table.	Severe: high frost-action potential.	Fair in sandy substratum; poor in loamy part above sandy substratum; high frost-action potential.
Sparta: SpA, SpB	Slight[3]	Severe: very rapid permeability.[3]	Severe: sidewall instability.	Slight	Severe: sandy; very rapid permeability.[3]	Slight	Good
SpC	Moderate: slope.[3]	Severe: slope; rapid permeability.[3]	Severe: sidewall instability; slope.	Moderate: slope.	Severe: sandy; very rapid permeability.[3]	Moderate: slope.	Good
Sparta, mottled subsoil variant: SrA.	Severe: seasonal high water table.[3]	Severe: rapid permeability.[3]	Severe: sidewall instability; seasonal high water table.	Moderate to severe: seasonal high water table.	Severe: sandy rapid permeability.[3]	Moderate: seasonal high water table.	Fair: seasonal high water table.
Stony and rocky land: St. No interpretations; limitations severe for most uses.							

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Unsuited: no sand.	Good	Moderate permeability.	Medium to low permeability; medium to high piping hazard.	Well drained	Very high available water capacity; moderate water-intake rate.	Gently sloping; deep silt.	Silty; slight erosion hazard.
Unsuited: no sand.	Fair: slope; erodible.	Moderate permeability.	Medium to low permeability; medium to high piping hazard.	Well drained	Very high available water capacity; moderate water-intake rate.	Sloping; deep silt.	Silty; moderate erosion hazard.
Unsuited: no sand.	Poor: slope; erodible.	Slope: moderate permeability.	Medium to low permeability; medium to high piping hazard.	Well drained	Very high available water capacity; moderate water-intake rate.	Moderately steep to steep; deep silt.	Silty; severe to very severe erosion hazard.
Fair: sandy substratum; seasonal high water table.	Good	Rapid permeability in substratum; seasonal high water table.	Medium to low permeability but ranges to high in sandy substratum.	Somewhat poorly drained.	Moderate available water capacity; moderate water-intake rate; seasonal high water table.	Nearly level to gently sloping; sand at a depth of 2 to 3 feet.	Loamy; slight erosion hazard; seasonal high water table.
Good	Poor: sandy	Rapid permeability.	High permeability; medium to high piping hazard.	Excessively drained.	Low available water capacity; very rapid water-intake rate.	[4]	Low available water capacity; low natural fertility.
Good	Poor: sandy; slope; erodible.	Rapid permeability.	High permeability; medium to high piping hazard.	Excessively drained.	Low available water capacity; slope; rapid water-intake rate.	[4]	Low available water capacity; low natural fertility.
Fair: seasonal high water table.	Poor: sandy	Rapid permeability; seasonal high water table.	High permeability; medium to high piping hazard.	Moderately well drained to somewhat poorly drained.	Low available water capacity; seasonal high water table.	Sandy; seasonal high water table.	Low available water capacity; low natural fertility; seasonal high water table.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Trempe: TrA, TrB	Slight [3]	Severe: rapid permeability.[3]	Severe: sidewall instability.	Slight	Severe: sandy; rapid permeability.[3]	Slight	Good
Trempealeau: TuA.	Slight [3]	Severe: rapid permeability in substratum.[3]	Moderate: sidewall instability in substratum.	Slight	Severe: rapid permeability in sandy substratum.[3]	Severe: high frost-action potential.	Good in sandy substratum; poor in loamy part above sandy substratum; high frost-action potential.
Trempealeau, mottled subsoil variant: TvA.	Severe: seasonal high water table.[3]	Severe: rapid permeability in substratum; seasonal high water table.[3]	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; rapid permeability in sandy substratum.[3]	Severe: high frost-action potential.	Fair in sandy substratum: seasonal high water table. Poor in loamy part above substratum: high frost-action potential.
*Urne: UfB, UfC2, UnC2.	Severe: soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: soft; shaly sandstone at a depth of 2 to 3 feet.	Severe: soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: high frost-action potential.	Fair in soft, shaly sandstone; poor in part above sandstone; high frost-action potential.
UfD2, UfE2, UfF, UnD2, UnE2, UrD2, UrE, UrF. For Norden part of UrD2, UrE, and UrF, see Norden series.	Severe: slope; soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: slope; soft, shaly sandstone at a depth of 2 to 3 feet.	Severe: slope; high frost-action potential.	Fair in soft, shaly sandstone; poor in upper loamy part; high frost-action potential.
Wallkill: WaA	Severe: seasonal high water table.	Severe: moderately rapid permeability in substratum; seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; high in organic-matter content in substratum.	Severe: seasonal high water table.	Severe: seasonal high water table; high frost-action potential; high organic-matter content in substratum.	Poor: silty in upper part; high frost-action potential; high organic-matter content in substratum.

See footnotes at end of table.

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [2]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Good	Poor: sandy	Rapid permeability.	High permeability; medium to high piping hazard.	Excessively drained.	Low available water capacity; very rapid water-intake rate.	[4]	Low available water capacity; low natural fertility.
Good: sandy substratum.	Good	Rapid permeability in substratum.	Medium to low permeability but ranges to high in sandy substratum.	Well drained	Moderate available water capacity; moderate water-intake rate.	Nearly level to gently sloping; sand at a depth of 2 to 3 feet.	Loamy; slight erosion hazard.
Fair: sandy substratum; seasonal high water table.	Fair: iron fragments in upper part of subsoil.	Rapid permeability in substratum.	Medium to low permeability but ranges to high in sandy substratum.	Somewhat poorly drained.	Moderate available water capacity; seasonal high water table.	Nearly level to gently sloping; sand at a depth of 2 to 3 feet.	Loamy; slight erosion hazard; seasonal high water table.
Poor: soft, shaly sandstone at a depth of 2 to 3 feet.	Poor: borrow area shallow to sandstone; revegetation difficult.	Soft, shaly sandstone at a depth of 2 to 3 feet; moderate permeability.	Medium to low permeability but soft, shaly sandstone at a depth of 2 to 3 feet.	Well drained	Low available water capacity; gently sloping to sloping.	Gently sloping to sloping; soft, shaly sandstone at a depth of 2 to 3 feet.	Loamy; slight to moderate erosion hazard.
Poor: soft, shaly sandstone at a depth of 2 to 3 feet.	Poor: borrow area shallow to sandstone; revegetation difficult; slope; erodible.	Slope; soft, shaly bedrock at a depth of 2 to 3 feet; moderate permeability.	Medium to low permeability but soft, shaly sandstone at a depth of 2 to 3 feet.	Well drained	Low available water capacity; moderately steep to very steep.	Short, uneven slopes; soft, shaly sandstone at a depth of 2 to 3 feet.	Loamy; severe to very severe erosion hazard.
Unsuited: no sand.	Poor: seasonal high water table.	Moderately rapid permeability in substratum; seasonal high water table.	High organic-matter content in substratum at a depth of 20 to 40 inches.	Well drained	Very high available capacity; moderate water-intake rate; seasonal high water table.	Nearly level to gently sloping; high organic-matter content in substratum at a depth of 20 to 40 inches.	Silty; slight erosion hazard.

TABLE 6.—*Interpretations of engineering*

Soil series and map symbols	Degree and kind of limitation for—						Suitability as source of—
	Septic tank absorption fields	Sewage lagoons	Shallow excavations	Dwellings with basements	Trench-type sanitary landfill [1]	Local roads and streets	Road fill
Wet alluvial land: We. No interpretations; limitations severe for most uses.							
Whitehall: WhA	Slight: rapid permeability in substratum.[3]	Severe: rapid permeability in substratum.[3]	Moderate: sidewall instability in substratum.	Slight	Severe: rapid permeability in sandy substratum.[3]	Severe: high frost-action potential.	Good in sandy substratum; poor in upper silt part; high frost-action potential.
Worthen: WoA	Moderate if gently sloping; severe if nearly level; occasional shallow flooding.	Moderate: moderate permeability; nearly level areas subject to occasional shallow flooding.	Moderate if gently sloping; severe if nearly level; subject to occasional shallow flooding.	Moderate if gently sloping; severe if nearly level; subject to occasional shallow flooding.	Slight if gently sloping; severe if nearly level; subject to occasional shallow flooding.	Severe: high frost-action potential.	Poor: silty; high frost-action potential.

[1] Onsite studies of the underlying strata, water table, and hazards of aquifer pollution and drainage into ground water should be made for landfill deeper than 5 or 6 feet.
[2] Permeability ratings are for compacted soils.
[3] Pollution is a hazard in places because of rapid or very rapid permeability in the substratum.

polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. Unless otherwise stated the ratings in table 6 apply only to a depth of about 5 feet, and therefore limitation ratings of *slight* or *moderate* may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 to 15 feet, but regardless of that, every site should be investigated before it is selected.

Local roads and streets, as rated in table 6, have an all-weather surface expected to carry automobile traffic all year. The have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 5 feet deep.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material, and also the shrink-swell potential, indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas.

Sand and gravel are used in great quantities in many kinds of construction. The ratings in table 6 provide guidance about where to look for probable sources. A soil rated as a *good* or *fair* source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of 5 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality of the deposit.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; natural fertility of the material, or its response of plants when fertilizer is applied; and absence of substances toxic to plants. Texture of the soil material and its content of stone fragments are characteristics that affect suitability, but also considered in the ratings

properties of the soils—Continued

Suitability as source of—continued		Soil features affecting—					
Sand	Topsoil	Pond reservoir areas	Embankments, dikes, and levees [4]	Drainage for crops and pasture	Irrigation	Terraces and diversions	Grassed waterways
Good: sandy substratum.	Good	Rapid permeability in substratum.	Medium to low permeability but ranges to high for sandy substratum.	Well drained to moderately well drained.	Medium available water capacity; moderate water-intake rate.	Nearly level to gently sloping; sand at a depth of 2 to 3 feet.	Silty; slight erosion hazard.
Unsuited: no sand.	Good	Moderate permeability.	Medium to low permeability; medium to low shear strength.	Well drained to moderately well drained.	Very high available water capacity; moderate water-intake rate.	Nearly level to gently sloping; deep silt.	Silty; slight erosion hazard; subject to occasional shallow flooding.

[4] Practice not applicable or not needed on this soil.
[5] Wisconsin Administrative Code, Chapter H65—Subdivisions not served by Public Sewers, requires at least 5 feet of soil cover over bedrock.

is damage that will result at the area from which topsoil is taken.

Pond reservoir areas hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Presence of stones or organic material in a soil are among factors that are unfavorable.

Drainage of crops and pasture is affected by such soil properties as permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; slope; stability in ditchbanks; susceptibility to stream overflow; salinity or akalinity; and availability of outlets for drainage.

Irrigation of a soil is affected by such features as slope; susceptibility to stream overflow, water erosion, or soil blowing; soil texture; content of stones; accumulations of salts and alkali; depth of root zone; rate of water intake at the surface; permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water; amount of water held available to plants, and need for drainage, or depth to water table or bedrock.

Terraces and diversions are embankments or ridges constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to a prepared outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for those structures provides outlets for runoff and is not difficult to vegetate.

Grassed waterways are used to carry runoff water off the land in such a way that little or no erosion occurs. Usually the waterway has to be shaped to proper dimensions, then seeded or sodded with suitable grass, and fertilized.

Engineering test data

Table 7 contains engineering test data for some of the major soil series in Trempealeau County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods for the Meridian and Seaton soils and by sieve and pipette methods for the Billett and Dickinson soils.

Compaction (or moisture-density) data are im-

TABLE 7.—*Engineering*

[Absence of an entry indicates

Soil name and location	Parent material	Depth	Moisture-density [1]		Mechanical analysis [2]	
			Maximum dry density	Optimum moisture	Percentage passing sieve—	
					No. 4 (4.7 mm)	No. 10 (2.0 mm)
		Inches	*Pounds per cubic foot*	*Percent*		
Billett fine sandy loam: [4] NE¼SW¼ sec. 2, T. 21 N., R. 9 W. (Modal).	Loamy sediment over sand.	0–8	-----	-----	100	100
		8–11	-----	-----	100	100
		11–19	-----	-----	100	100
		19–28	-----	-----	100	100
		28–34	-----	-----	100	100
Dickinson fine sandy loam: [5] SE¼NE¼ sec. 2, T. 18 N., R. 8 W. (Modal).	Loamy sediment over sand.	0–14	-----	-----	100	
		14–22	-----	-----	100	100
						100
Meridian loam: [6] NW¼SW¼ sec. 22, T. 24 N., R. 7 N. (Modal).	Loamy sediment over sand.	13–18	-----	-----	100	
		32–40	117	10	100	100
						100
Seaton silt loam: [6] SW¼SW¼ sec. 4, T. 2 N., R. 9 W. (Modal).	Silty loess.	15–25	-----	-----	100	
		34–45	111.9	14.3	100	100
						100

[1] Based on AASHO Designation: T 99–57, Method A (*1*).

[2] Mechanical analyses for the Meridian and Seaton soils were made according to AASHO Designation: T 88–57 (*1*). Mechanical analysis for the Billett and Dickinson soils were made by pipette analysis (*5*). Results by the AASHO procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

portant in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum moisture content* is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density*. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. In table 7 the data on liquid limit and plasticity index are based on tests of soil samples.

Formation and Classification of the Soils

This section tells how the factors of soil formation have affected the development of soils in Trempealeau County. It also explains the system of soil classification currently used and places each soil series represented in the county in some of the categories of that system.

Factors of Soil Formation

Soil is the product of the action of climate and living organisms upon parent materials, as conditioned by local factors of relief. The degree of the combined influence of these four factors is a function of time.

Climate and living organisms are regarded as the active agents of soil formation. They supply the energy for the alteration of unconsolidated rock materials. Parent material, relief, and time are generally regarded as passive agents in this process. All five factors affect the genesis of every soil. In extreme cases one factor may dominate the formation of a soil and determine most of its properties. In general, however, the influence of each of these factors is merged with the influence of others. A soil in any one place represents the effects of the interaction of all of these factors.

Parent material

Parent material is the unconsolidated mass from which soils form. Parent materials vary greatly in chemical and mineralogical composition, so the soils derived from them differ accordingly.

In Trempealeau County, the soils formed in bedrock

test data

that no determination was made]

Mechanical analysis [2]—Continued						Liquid limit	Plasticity index	Classification	
Percentage passing sieve—continued		Percentage smaller than—							
No. 40 (0.42 mm)	No. 200 (0.074 mm)	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHO [4]	Unified [5]
						Percent			
----	----	28.9	17.4	--	6.1	----	----	-------	-------
----	----	39.4	23.8	--	8.4	----	----	-------	-------
----	----	43.4	28.6	--	11.3	----	----	-------	-------
----	----	30.6	19.5	--	9.3	----	----	-------	-------
----	----	7.3	4.8	--	3.7	----	----	-------	-------
96.5	25.8	18.2	----	--	11.8	----	----	-------	-------
96.8	21.2	13.4	----	--	9.3	----	----	-------	-------
91	48	47	36	19	16	22	6	A-4(3)	SC-SM
66	5	3	3	3	2	----	[7] NP	A-3(0)	SP
100	98	96	49	25	21	31.4	9.1	A-4(8)	ML-CL
100	88	83	40	18	16	25.2	5.0	A-4(8)	ML-CL

[3] SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of A-line are to be given a borderline classification. Examples of borderline classifications obtained by this use are SM–SC and ML–CL.

[4] Tests made by SCS Soil Survey Laboratory, Beltsville, Md. (*10*).

[5] Tests made by Soil Survey Division, Geological and Natural History Survey, University of Wisconsin.

[6] Tests made by the State Highway Commission of Wisconsin in cooperation with the U.S. Department of Commerce, Bureau of Public Roads.

[7] Nonplastic.

residuum, loess (windblown silt), outwash sediment, alluvial silt, lacustrine clay, and decomposed peat.

Bedrock was originally laid down as sediment in ancient seas. It has a wide range in mineral composition. Dolomite, commonly called limestone, caps the highest ridgetops in the southern and western parts of the county. A very firm, reddish clay is weathered from this limestone to form part of the subsoil of Palsgrove soils, clayey subsoil variant. The Franconia member is a fine-grained glauconite sandstone that contains shale and siltstone; it produced a finer textured soil than is expected from sandstone. Urne and Norden soils developed in material weathered from Franconia sandstone. Desbach sandstone, which is on low valley slopes, and Trempealeau sandstone, which is on high sandstone ridges, are medium-grained; upon weathering they form loamy sands, sandy loams, and loams. Examples are soils in the Boone, Eleva, and Hixton series.

Soils formed in loess are the most extensive. They have a wide range of characteristics because the depth of loess and the material beneath the loess vary. Where loess has been thickly deposited, deep, silty soils, such as Fayette, Seaton, Port Byron, Downs and Muscatine soils, form. Peripheral to soils formed in deep loess are soils of the Gale, La Farge, Palsgrove, Pillot, and Whitehall series. These soils formed in moderately thick silt. Gale soils formed in loess that overlies medium-grained, cemented sandstone; La Farge soils in loess that overlies fine-grained, soft, shaly sandstone; Palsgrove soils in loess that overlies firm, reddish clay weathered from limestone; Pillot soils in loess or silty material that overlies loose, water-laid sand; and Whitehall soils in reddish-colored loess or silty material that overlies loose, water-laid sand.

Outwash sediment on stream terraces was laid down in streams that flowed at a higher level than they do today. The outwash in Trempealeau County has a mixed lithology. The glacial outwash contains granitic material, whereas the local outwash came from eroded sandstone residuum. Soils formed in outwash sediment are excessively drained and well drained loamy sands, sandy loams, and loams of the Sparta, Trempe, Gotham, Dickinson, Dunnville, Billett, Meridian, and Trempealeau series; the moderately well drained and somewhat poorly drained soils of the Sparta series, mottled subsoil variant, Trempealeau series, mottled subsoil variant, Kato series, sandy loam variant, and Morocco and Shiffer series.

Silty alluvium consists of deep sediment deposited on valley bottoms by stream overflow or in drainageways by runoff from upland areas. Soils formed in silty alluvium are well drained and moderately well drained Huntsville and Worthen soils, somewhat poorly drained Lawson and Boaz soils, and poorly drained Kato, Wallkill, and Ettrick soils.

Lacustrine clay is reddish-brown and grayish-brown slack-water sediment that was laid down in an ancient

backwater area on terraces of the Mississippi River south of Tamarack Creek. Soils that formed in lacustrine clay are somewhat poorly drained Denrock soils and poorly drained Denrock soils, wet variant.

Palms and Houghton soils formed in deposits of decomposed peat that occupy wet areas along small streams, mainly at the head of drainage systems. The most extensive area of these soils is in the Tamarack Valley near the southern part of the county.

Climate

Trempealeau County has a humid, continental climate that is characterized by extreme seasonal temperature changes. It has an annual precipitation of 31 inches. The average annual temperature is 45° F. A combined sequence of wetting and drying and of freezing and thawing intensifies the weathering of soil material. Frequent heavy rains erode soil material and leach plant nutrients, so most of the soils are eroded and are medium acid to strongly acid to a depth of more than 3 feet. Cool temperatures promote the accumulation of organic matter, which darkens the surface layer. Wind has played a significant role in soil development. It has deposited a mantle of silt (loess) over much of Trempealeau County. Fayette, La Farge, Seaton, and Downs soils formed in deep or moderately deep silt. These soils are friable and have high natural fertility and available water capacity. Recently wind has reworked and eroded many of the sandy terrace soils, especially those along the Mississippi River. More detailed information on climate is given in the section "General Nature of the County."

Plant and animal life

All living organisms are important in soil formation. These organisms include rooted plants, animals, bacteria, and fungi. Plants are generally responsible for adding organic matter to the soils. Animals, such as earthworms, ants, and rodents, help to mix the soil and keep it porous. Also, these animals, and fungi and bacteria, consume and decompose organic matter, releasing plant nutrients and darkening the surface layer.

In Trempealeau County prairie grass associated with open groves of oak trees was the dominant kind of vegetation (*3*). This kind of vegetation, with its fibrous root systems, yielded sufficient organic matter to form a dark-colored, or mollic, surface layer 6 to 20 inches thick. Dickinson, Downs, Dunnville, Ettrick, Huntsville, Meridian, and Port Byron soils are examples of dark-colored soils in Trempealeau County.

Native trees covered less than 30 percent of the land area in Trempealeau County. Most of the forest was in the lowlands along Black River or in an area north and west of Trempealeau River. In wooded areas most of the organic matter in the soil consists of decaying leaves that are mixed with mineral soil to form a thin, dark-colored surface layer. Leaf decay releases plant nutrients, but it also releases organic acids, which accelerate the weathering of soils and the movement of plant nutrients and clay down through the soil. This forms a light-colored subsurface layer from which the clay has been leached and a subsoil layer in which the clay has accumulated. In wooded areas the subsoil generally contains more clay than in prairie areas. Fayette, La Farge, Seaton, and Palsgrove soils are examples of soils that formed under forest vegetation.

Relief

Relief, or the lay of the land, influences drainage, runoff, and soil temperature. Trempealeau County has a variable relief. In most areas the cross-country distance from the valley bottoms to the upland ridgetops is less than a mile. Soils are nearly level to gently sloping on the valley bottoms; moderately steep to very steep on the side slopes of the valleys and uplands; and gently sloping to moderately steep on the upland ridgetops.

Drainage and runoff water are directly influenced by relief. Depressions and concave areas are usually wet for long periods where they receive extra runoff water and where the water table is near the surface. The surface layer in these areas is thicker and darker than in others. The poorly drained Ettrick soils and the somewhat poorly drained Boaz soils are on nearly level or slightly concave valley bottoms, and the well-drained Fayette and Seaton soils are on gently sloping to steep uplands.

Constant geologic erosion occurs where slopes are steep and very steep. Soil material is thus carried away before the factors of soil formation have had their full effect. For example, Boone and Eleva soils are in steep areas, and they absorb less moisture, are less deep, and show less-distinct development than gently sloping and sloping Boone and Eleva soils. Some areas, such as Stony and rocky land, have so much runoff that geologic erosion almost keeps pace with the weathering of bedrock and the initial stages of soil formation.

Soil temperature in steep areas varies. It is lower where slopes face east and north than where slopes face west and south.

Time

Time, usually a long time, is required for a mature soil to form from parent material. Some soils, such as Boaz, Huntsville, Wallkill, and Worthen soils, have been in place only a short time. Soil-forming factors of climate, relief, and living organisms have not influenced these soils enough to form horizons of eluviation and illuviation. Other soils, such as Boone, Trempe, Sparta, Dunnville, and Dickinson soils, have been in place for some time, but the parent material lacks sufficient weatherable minerals to form significant horizons of eluviation and illuviation. Also, such steep soils as Boone and Urne soils have only weakly defined horizons because constant geologic erosion has overcome the influence of other soil-forming factors.

Mature soils have well-defined horizons of eluviation and illuviation. They have been in place long enough for their development to approach an equilibrium with the environment. Ordinarily these soils are well drained and nearly level to moderately steep. Fayette, La Farge, and Hixton soils are mature. Some soils that have very deep development and show some degradation in the upper part of the soil are in advanced maturity. Palsgrove soils are in this stage of development.

Morphology of the Soils

This subsection provides a brief description of the horizon nomenclature of soils. In addition, the processes involved in horizon development are discussed.

The results of the factors of soil formation can be distinguished by the different layers, or horizons, in a soil profile. The profile extends from the surface down to material that has been little altered by the soil-forming process.

Most soils contain three major horizons, called A, B, and C. These major horizons may be further subdivided by the use of subscripts and letters to indicate differences within one horizon.

The A horizon is the surface layer. If it has been disturbed or cultivated, it may be designated an Ap horizon. It is the layer that has the largest accumulation of organic matter. The A2 horizon generally develops below an A1 horizon or Ap horizon, where considerable leaching has taken place. It is a layer of maximum leaching, or eluviation, of clay and iron.

The B horizon lies underneath the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay or iron leached from the A horizon. The B horizon is generally firmer and has blocky or prismatic structure.

The C horizon is below the B horizon. It consists of material that is little altered by the soil-forming processes but may be modified by weathering.

Several processes are involved in the formation of horizons in the soils of Trempealeau County. These include the accumulation of organic matter, the leaching of lime carbonates, the formation and translocation of clay minerals, and the reduction and transfer of iron. These processes are continually taking place, generally at the same time, throughout the profile. These processes are very slow and take hundreds to thousands of years to reach equilibrium with the environment.

The accumulation of organic matter takes place with the decomposition of plant residue. This process darkens the surface layer and helps to form the A1 horizon. Organic matter, once it has been lost, takes a long time to replace. The soils of Trempealeau County have low to high organic-matter content.

It is believed that lime and other soluble salts are leached before the translocation of clay minerals. Many factors affect this leaching, such as the kinds of salts originally present, the depth to which the soil solution percolates, and the texture of the profile. Some soils are continually being recharged with lime carbonates by the movement of water up from underground sources. This retards leaching; thus, the formation of illuviated clay horizons is slow. The leaching and recharging of lime carbonates and soluble salts has occurred in the somewhat poorly drained and poorly drained soils, such as those of the Denrock, Ettrick, Houghton, Lawson, Palms, and Wallkill series.

The most important process of soil-horizon formation in Trempealeau County is the formation and translocation of silicate clay minerals. The amount of clay minerals in a profile is inherent in the parent material, but the amount of clay varies from one horizon to another. Clay minerals are generally eluviated from the A horizon and illuviated in the B horizon as clay films on ped faces and in pores and root channels. In some soils an A2 horizon has formed by considerable eluviation of clay minerals to the B horizon. The A2 horizon is grayish brown in color and has platy structure. La Farge soils are an example of a soil that has clay mineral translocation.

The reduction and transfer of iron is associated mainly with the wetter, more poorly drained soils. This process is called gleying. Moderately well drained to somewhat poorly drained soils have yellowish-brown and reddish-brown mottles, indicating the segregation of iron. Poorly drained to very poorly drained soils have a subsoil and underlying material that are grayish colored, indicating reduction and transfer of iron. Boaz, Ettrick, and Kato soils are some of the soils that have indications of the reduction and transfer of iron.

Classification of the Soils

Soils are classified so that we can more easily remember their significant characteristics. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The narrow categories of classification, such as those used in detailed soil surveys, allow us to organize and apply knowledge about soils in managing farms, fields, and woodlands; in developing rural areas; in engineering work; and in many other ways. Soils are placed in broad classes to facilitate study and comparison in large areas such as countries and continents.

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Because this system is under continual study, readers interested in developments of the current system should search the latest literature available *(6, 8)*.

The current system of classification has six categories. Beginning with the broadest, these categories are order, suborder, great group, subgroup, family, and series. In this system the criteria used as a basis for classification are soil properties that are observable and measurable. The properties are chosen, however, so that soils of similar genesis, or mode of origin, are grouped. In table 8 the soil series of Trempealeau County are placed in some categories of the current system. Classes of the current system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized. The properties used to differentiate among soil orders are those that tend to give broad climatic groupings of soils. The two exceptions to this are Entisols and Histosols, which occur in many different climates. Each order is named with a word of three or four syllables ending in *sol* (Moll-i-sol).

SUBORDER: Each order is subdivided into suborders that are based primarily on those soil characteristics that seem to produce classes with the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The soil properties used to separate suborders are mainly those that reflect

TABLE 8.—*Classification of soil series of Trempealeau County*

Series	Family	Subgroup	Order
Billett	Coarse-loamy, mixed, mesic	Mollic Hapludalfs	Alfisols.
Boaz	Fine-silty, mixed, nonacid, mesic	Aeric Haplaquepts	Inceptisols.
Boone	Mesic, uncoated	Typic Quartzipsamments	Entisols.
Denrock	Fine, mixed, mesic	Aquic Argiudolls	Mollisols.
Denrock, wet variant	Fine, mixed, mesic	Typic Argiaquolls	Mollisols.
Dickinson	Coarse-loamy, mixed, mesic	Typic Hapludolls	Mollisols.
Downs	Fine-silty, mixed, mesic	Mollic Hapludalfs	Alfisols.
Dunnville [1]	Coarse-loamy, mixed, frigid	Typic Haploborolls	Mollisols.
Eleva [1]	Coarse-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Ettrick [1]	Fine-silty, mixed, noncalcareous, mesic	Typic Argiaquolls	Mollisols.
Ettrick, clayey subsoil variant	Fine, mixed, noncalcareous, mesic	Typic Argiaquolls	Mollisols.
Fayette	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Gale	Fine-silty over sandy or sandy-skeletal, mixed, mesic	Typic Hapludalfs	Alfisols.
Gotham	Sandy, mixed, mesic	Psammentic Hapludalfs	Alfisols.
Hixton	Fine-loamy over sandy or sandy-skeletal, mixed, mesic	Typic Hapludalfs	Alfisols.
Houghton [1]	Euic, mesic	Typic Medisaprists	Histosols.
Huntsville	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Kato	Fine-silty over sandy or sandy-skeletal, mixed, noncalcareous, mesic.	Typic Haplaquolls	Mollisols.
Kato, sandy loam variant	Coarse-loamy, mixed, noncalcareous, mesic	Typic Haplaquolls	Mollisols.
La Farge	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Lawson [1]	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.
Meridian	Fine-loamy over sandy or sandy-skeletal, mixed, mesic	Mollic Hapludalfs	Alfisols.
Morocco	Sandy, mixed, mesic	Aquic Udipsamments	Entisols.
Muscatine	Fine-silty, mixed, mesic	Aquic Argiudolls	Mollisols.
Norden	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols.
Palms	Loamy, mixed, euic, mesic	Terric Medisaprists	Histosols.
Palsgrove	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Palsgrove, clayey subsoil variant.	Fine, mixed, mesic	Typic Hapludalfs	Alfisols.
Pillot	Fine-silty over sandy or sandy-skeletal, mixed, mesic	Typic Argiudolls	Mollisols.
Port Byron [1]	Fine-silty, mixed, mesic	Typic Hapludolls	Mollisols.
Seaton	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols.
Shiffer [1]	Fine-loamy over sandy or sandy-skeletal, mixed, mesic	Aquollic Hapludalfs	Alfisols.
Sparta	Sandy, mixed, mesic	Entic Hapludolls	Mollisols.
Sparta, mottled subsoil variant	Sandy, mixed, mesic	Aquic Hapludolls	Mollisols.
Trempe	Sandy, mixed, mesic	Entic Hapludolls	Mollisols.
Trempealeau	Fine-loamy over sandy or sandy-skeletal, mixed, mesic	Typic Argiudolls	Mollisols.
Trempealeau, mottled subsoil variant.	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic.	Aquic Argiudolls	Mollisols.
Urne	Coarse-loamy, mixed, mesic	Dystric Eutrochrepts	Inceptisols.
Wallkill [1]	Fine-loamy, mixed, nonacid, mesic	Thapto-Histic Fluvaquents	Entisols.
Whitehall	Fine-silty over sandy or sandy-skeletal, mixed, mesic	Typic Argiudolls	Mollisols.
Worthen	Fine-silty, mixed, mesic	Cumulic Hapludolls	Mollisols.

[1] Most of the soils in these series are taxadjunct to the series for which they are named. They differ from the series as follows:
Dunnville—A few degrees warmer.
Eleva—Some of these soils have an argillic horizon that is loamy sand or sand.
Ettrick—Lack stratification in the lower part of the control section.
Houghton—Some of these soils have a hemic or terric layer in the profile.
Lawson silt loam, 0 to 3 percent slopes—Mottles in the lower part of the mollic epipedon are higher in chroma.
Port Byron—Weakly expressed argillic horizons. Clay content is too low and coarse-silt-fine silt ratio is too high to be correlated as Tama soils.
Shiffer—Less well developed argillic horizons.
Wallkill—Higher content of silt and lower content of sand.

either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. The names of suborders have two syllables. The last syllable indicates the order. An example is *Aquoll* (*Aqu*, meaning water or wet, and *oll*, from Mollisol).

GREAT GROUP: Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major soil horizons and features. The horizons used to make separations are those in which clay, iron, or humus have accumulated; those that have pans that interfere with growth of roots, movement of water, or both; and thick, dark-colored surface horizons. The features used are the self-mulching properties of clay, soil temperature, major differences in chemical composition (mainly calcium, magnesium, sodium, and potassium), dark-red and dark-brown colors associated with basic rocks, and the like. The names of great groups have three or four syllables and are made by adding a prefix to the name of the suborder. An example is Haplaquolls (*Hapl*, meaning simple horizons, *aqu* for wetness or water, and *oll*, from Mollisols).

SUBGROUP: Great groups are subdivided into subgroups, one representing the central (typic) segment of the group, and others called intergrades that have properties of the group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside of the range of any other great group, suborder, or order. The names of sub-

groups are derived by placing one or more adjectives before the name of the great group. An example is Typic Haplaquolls (a typical Haplaquoll).

FAMILY: Soil families are separated within a subgroup primarily on the basis of properties important to the growth of plants or to the behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence. A family name consists of a series of adjectives preceding the subgroup name. The adjectives are the class names for texture, mineralogy, and so on, that are used as family differentiae. An example is the fine-silty over sandy or sandy-skeletal, mixed, noncalcareous, mesic family of Typic Haplaquolls.

General Nature of the County

In this section the settlement and development of Trempealeau County are discussed. Also, information is provided concerning the climate, relief and drainage, and farming.

Settlement and Development

The area now known as Trempealeau County is believed to have been inhabited by the Indians until 1685. The first attempt to settle was made in that year by Nicolas Perrot, who established a fortified trading post near Trempealeau Mountain. John Doville, however, who also settled near the present site of Trempealeau about 1839, is credited with being the first permanent settler. In the 1840's a few more people came to the area. Trempealeau County was created in 1854, and in 1857 its present boundaries were established. Whitehall, population about 1,446, is the county seat. Five other small cities are in the county: Arcadia, Galesville, Osseo, Blair, and Independence.

Trempealeau County made its economic beginning with the early trappers and traders. They were followed by the early settlers, who grew small acreages of cultivated crops. As more land was broken, wheat became the main crop. Continuous cropping soon depleted the natural fertility of the soils. The chinch bug also appeared in spots but soon expanded to other areas. By the middle 1880's dairying received its first real start with the establishment of creameries. It soon became the principal enterprise and still is today.

Production of meat, poultry, and lumber is also important. There is a vital interest in establishing new industry in the county. Limestone is the main mineral. Some large limestone areas are quarried. Crushed limestone is used for roadbuilding and agricultural lime. Also, summer and winter outdoor sports are popular. Most fishing is on the Mississippi River. Perrot State Park along the Mississippi River is a favorite camping area. Numerous wooded areas for hunting occur throughout the county. Snowmobiling and skiing are popular in winter.

Trempealeau County is served by three railroads: the Burlington Road, the Chicago and North Western, and the Green Bay and Western. State Highway No. 35 crosses the county from east to west, connecting with Winona, Minnesota; U.S. Highway No. 53 crosses the county from north to south, joining La Crosse and Eau Claire; and U.S. Highway No. 10 and Interstate Highway No. 94 are the major east-west roads into the Twin Cities.

Climate [5]

The climate of Trempealeau County is continental, characterized by marked changes in weather common to locations in the interior of large land masses in the middle latitudes. Day length ranges from approximately 15 1/2 hours in June to 9 hours late in December.

Winters are cold and snowy. Summers are warm and have periods that are hot and humid. Spring and fall are sometimes short and are often a mixture of summer and winter. Weather changes can be expected every few days in winter and in spring. The climatological information and data are based on observations taken at Blair and should be fairly representative of Trempealeau County. Data on average temperatures are given in table 9. Data concerning the probabilities of the last freezing temperatures in spring and the first in fall are provided in table 10.

Since 1925 the highest temperature has been 109° F., and the lowest −45°. The number of days with temperatures of 90° and above averages 20 per year, and ranges from 2 to 38 days. The number of days with temperatures dropping to 0° or below averages 34 per year and ranges from 9 to 53.

Precipitation from May through September averages about 65 percent of the annual total. Rainfall of 1 inch or more in a 7-day period in summer occurs most often in June, about 4 years in 10. A 7-day dry period, when there is a trace of rain or less, in summer occurs most often during the last half of August, about 2 years in 10. Rainfall intensities of about 1.30 inches in 1 hour, 2.00 inches in 6 hours, and 2.70 inches in 24 hours can be expected about once in 2 years. The greatest amount of rain in 24 hours was 6.25 inches, which fell on August 31, 1902.

Annual snowfall averages 50 inches, but in recent years it has ranged from 15 to 86 inches. The average date of the first snowfall of 1 inch or greater is November 18. The chance of the first snowfall by October 23 is 1 in 10, and by December 14 it is 9 in 10.

Thunderstorms occur on an average of 42 days per year and generally range from 61 to 24 days per year. Hail averages 2 days per year and ranges from 0 to 7 days. Thunderstorms at times are severe and are accompanied by heavy rains, strong winds, and damaging hail. In a 60-year period, nine tornadoes have been recorded in Trempealeau County.

The prevailing winds are from the northwest from late in fall to early in spring and from southerly directions for the rest of the year. July and August have been the least windy; windspeed averages 9 miles per hour. The windspeed has averaged less than 4 miles per hour about 10 percent of the time, 4 to 12 miles per hour 60 percent, 13 to 31 miles per hour 30 percent, and greater than 31 miles per hour less

[5] By HANS E. ROSENDAL, climatologist for Wisconsin, National Weather Service, U.S. Department of Commerce.

TABLE 9.—*Temperature and precipitation data*

[All data from Blair]

Month	Temperature				Precipitation				
	Average daily high	Average daily low	Average monthly highest	Average monthly lowest	Average	One year in 10 will have—		Number of days with snow cover 1 inch or more	Average depth of snow on days with snow cover
						Less than—	More than—		
	°F	°F	°F	°F	In	In	In		In
January	25	4	44	−24	1.2	0.3	2.6	27	6
February	29	6	47	−22	1.1	0.2	2.3	23	7
March	40	19	64	−4	1.9	0.5	3.5	15	5
April	57	33	78	18	2.6	1.2	3.9	2	3
May	71	45	87	27	3.7	1.3	6.6	(1)	2
June	80	55	93	37	4.6	2.5	7.5	0	0
July	85	59	97	44	3.8	1.5	7.8	0	0
August	83	57	95	40	3.8	1.4	7.5	0	0
September	74	48	89	28	3.6	1.2	7.3	0	0
October	62	37	79	20	2.0	0.2	5.0	(1)	1
November	43	23	66	3	1.9	0.5	3.3	5	2
December	29	11	47	−20	1.0	0.3	1.9	20	4
Year	56	33	[2] 99	[3] −28	31.2	25.5	40.5	92	5

[1] Less than one-half day.
[2] Average annual highest temperature.
[3] Average annual lowest temperature.

TABLE 10.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data from Blair]

Probability	Dates for given probability and temperature				
	16° F or lower	20° F or lower	24° F or lower	28° F or lower	32° F or lower
Spring:					
1 year in 10 later than	April 12	April 25	May 11	May 22	June 3
2 years in 10 later than	April 6	April 19	May 5	May 17	May 29
5 years in 10 later than	March 27	April 8	April 24	May 7	May 19
Fall:					
1 year in 10 earlier than	October 20	October 11	September 27	September 17	September 8
2 years in 10 earlier than	October 26	October 16	October 3	September 23	September 13
5 years in 10 earlier than	November 6	October 27	October 14	October 4	September 24

than 1 percent. The highest speeds are generally from one of the westerly directions.

Possible sunshine has averaged between 60 and 70 percent for June through September, near 40 percent for November and December, and between 50 and 60 percent for the remaining months.

The average date of the last 32° freeze in spring is May 19 and of the first 32° freeze in fall is September 24. The growing season, defined as the number of days between the last 32° freeze in spring and the first in fall, averages 128 days.

Relief and Drainage

There are two main ridges in the county. They are separated by the Trempealeau River. One ridge is in the northern part of the county and lies east and west. The bedrock in this area is mainly medium-grained and fine-grained sandstone that dips gently to the southwest.

The other ridge is in the southern part of the county. It lies east and west on the eastern side of the county and then makes approximately a right angle turn and lies north and south in the central and western parts of the county. The bedrock in this area is mainly medium-grained and fine-grained sandstone that is capped by dolomitic limestone in some areas. The bedrock in this area also dips gently to the southwest. The limestone ridges have the highest elevation and the steepest relief in the county. The elevation of the limestone ridges is about 1,200 feet, or about 500 feet above the adjacent valleys. Most of the rolling sandstone uplands are about 250 feet above the adjacent valleys.

Trempealeau County has three major watersheds. The Buffalo River drains the northern part of the county, and the Black River drains the southeastern part. The Trempealeau River drains the rest of the county. It is also the largest watershed in the county. All of the rivers eventually drain into the Mississippi River.

Farming

In 1964, according to the U.S. Census of Agriculture, the total land in farms was about 432,000 acres, or about 90 percent of the county. Of this area, about 37 percent was in harvested cropland, 22 percent in pasture, 14 percent in pastured woodland, 13 percent in woodland, and 14 percent in other uses. There has been a trend toward grassland farming. Gradually, more of the steeper areas of cropland are being used for hay and pasture. The pasturing of woodland has also gradually decreased in recent years.

According to 1964 Census of Agriculture, livestock and livestock products accounted for about 93 percent of the total income derived from the sale of farm products. Of the total, 53 percent comes from the sale of dairy products, about 17 percent from poultry and eggs, about 15 percent from the sale of cattle and calves, and 8 percent from hogs, sheep, and miscellaneous livestock. The sale of crops accounts for about 6 percent of the farm income. Forest, nursery, and greenhouse products account for less than 1 percent of the total farm income.

Alfalfa hay is the main crop. Since 1952 alfalfa has become more important than clover or timothy. Some reasons for the trend are the higher nutritive value, higher yields, new alfalfa varieties, and the perennial nature of alfalfa.

Corn is the second most important crop in Trempealeau County. Total acreage has varied slightly during the last 25 years, but yields have steadily increased from about 42 bushels per acre between 1940 and 1944 to 80 bushels per acre in 1967. Since the advent of early maturing hybrid varieties, it is possible to harvest more corn for grain and less for silage. In 1967 about 29,000 acres were harvested for grain and 14,100 acres for silage. Most of the corn is fed to livestock on the farm.

Oats are the third most important crop in Trempealeau County. In the last 20 years, the acreage in oats has decreased from 60,000 to 29,000 acres, but yields have steadily increased from about 35 bushels per acre between 1940 and 1944 to about 50 bushels per acre in 1967. Practically all of the oats is ground, mixed with protein concentrate, and fed to livestock on the farms. Oat straw is used for cattle bedding.

In 1964 Trempealeau County ranked fourth among Wisconsin counties in the acreage and weight of apples harvested. In 1964, more than 3,500,000 pounds of apples were harvested. Apple orchards in Trempealeau County are mostly planted on moderately high valley sides and ridges in the Galesville area. Such deep silty soils as Fayette, Seaton, and La Farge soils are well suited to apple orchards.

In 1967 Trempealeau County ranked sixth among Wisconsin counties in the volume of soybeans harvested. Soybeans are adapted to loamy sands and sandy loams such as Dickinson, Gotham, and Billett soils. Large acreages are grown on a large sandy terrace along the Mississippi River. Green peas and sweet corn were raised on 2,450 acres in 1967. Most of these crops are grown on nearly level, silty benches along Beaver Creek and on a large sandy terrace along the Mississippi and Black Rivers. The peas and sweet corn are processed and canned at nearby Galesville.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Argillic horizon. A layer that contains an accumulation of illuvial silicate clay.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Bottom land. Low land formed by alluvial deposit along a stream or in a lake basin. A flood plain.

Cambic horizon. A layer in which changes have been sufficient (1) to give rise to structure, (2) to liberate free iron oxide, (3) to form silicate clay minerals, (4) to obliterate most evidence of original rock structure, or (5) some combination of these. Illuviation of iron, humus, or clay is not sufficient to qualify the horizon as argillic.

Chert. A compact, siliceous rock formed of chalcedonic or opaline silica or both; of organic or precipitated origin. Chert occurs distributed through limestone, forming cherty limestones. Flint is a variety of chert.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Dolomite. A common rock-forming mineral, $CaMg(CO_3)_2$. It occurs in many crystalline and noncrystalline forms and among rocks of all ages. Also called magnesium limestone.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Eluviation. The movement of material from one place to another within the soil, in either true solution or colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Escarpment. A steep slope; steep slopes below lake terraces.

Glauconite. A green mineral, closely related to the micas and essentially a hydrous potassium iron silicate, but usually a mixture and consequently varying much in composition. Commonly occurs in sedimentary rocks of marine origin.

Ground water (geology). Water that fills all unblocked pores of the underlying material below the water table, which is the upper limit of saturation.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Humus. The well-decomposed, more or less stable part of the organic matter in mineral soils.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material and organic matter removed from horizons above. Since part of the fine clay in the B horizon, or subsoil, of many soils has moved into the B horizon from the A horizon above, the B horizon is called an illuvial horizon.

Loess. Fine-grained material, dominantly of silt-sized particles, that has been deposited by wind.

Loam. Soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Mollic epipedon. A thick, dark-colored surface layer that is much like the surface layer of soils that formed under grass. This layer may have moderate to strong structure, a base saturation of 50 percent or more, and calcium as the dominant metallic cation.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Muck. An organic soil consisting of fairly well decomposed organic material that is relatively high in mineral content, finely divided, and dark in color.

Outwash. Stratified drift deposited by meltwater beyond active glacier ice.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residuum

is not soil but is frequently the material in which a soil has formed.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Savanna. An area of grassland usually flat and devoid of trees or containing only scattered trees.

Siliceous. Adjective applied to rocks and soil material that contains silica. Silica is an oxide of silicon, SiO_2, and is the most abundant constituent of the earth's crust.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Stratified. Composed of, or arranged in, strata, or layers, such as stratified alluvium. The term is confined to geological material. Layers in a soil that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowland along rivers.

Variant, soil. A soil having properties sufficiently different from those of other known soils to suggest establishing a new soil series, but a soil of such limited known area that creation of a new series is not believed to be justified.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and the soil series to which the mapping unit belongs. In referring to a capability unit, a woodland group, or a wildlife group, read the introduction to the section it is in for general information about its management. Other information is given in tables as follows:

Acreage and extent, table 1, page 13.
Predicted yields, table 2, page 71.
Wildlife groups, table 3, page 78.

Engineering uses of the soils, tables 5, 6, and 7, pages 82 through 112.

Map symbol	Mapping unit	Page	Capability unit		Woodland group		Wildlife group
			Symbol	Page	Number	Page	Number
B1A	Billett fine sandy loam, 0 to 2 percent slopes	14	IIIs-4	66	3	75	3
B1B	Billett fine sandy loam, 2 to 6 percent slopes	14	IIIs-4	66	3	75	3
B1C2	Billett fine sandy loam, 6 to 12 percent slopes, eroded	14	IIIe-7	66	3	75	3
B1D2	Billett fine sandy loam, 12 to 20 percent slopes, eroded	15	IVe-7	67	3	75	3
BmA	Boaz silt loam, 0 to 3 percent slopes	15	IIw-13	65	9	76	5a
BnB	Boone loamy sand, 2 to 6 percent slopes	16	IVs-3	67	4	75	3
BnC2	Boone loamy sand, 6 to 12 percent slopes, eroded	17	VIs-3	69	4	75	3
BnE2	Boone loamy sand, 12 to 30 percent slopes, eroded	17	VIIs-3	70	4	75	3
Dc	Denrock silt loam	17	IIw-2	64	7	75	5a
De	Denrock silt loam, wet subsoil variant	18	IIw-1	64	7	75	5b
DkA	Dickinson fine sandy loam, 0 to 2 percent slopes	19	IIIs-4	66	3	75	3
DkB	Dickinson fine sandy loam, 2 to 6 percent slopes	19	IIIs-4	66	3	75	3
D1A	Dickinson loam, 0 to 3 percent slopes	19	IIs-1	65	12	76	4
DoA	Downs silt loam, 0 to 2 percent slopes	20	I-3	63	12	76	1
DoB	Downs silt loam, 2 to 6 percent slopes	20	IIe-1	63	12	76	1
DoC2	Downs silt loam, 6 to 12 percent slopes, eroded	20	IIIe-1	65	12	76	1
DoD2	Downs silt loam, 12 to 20 percent slopes, eroded	20	IVe-1	66	12	76	1
DuA	Dunnville fine sandy loam, 0 to 2 percent slopes	21	IIIs-4	66	3	75	3
DuB	Dunnville fine sandy loam, 2 to 6 percent slopes	21	IIIs-4	66	3	75	3
DuC	Dunnville fine sandy loam, 6 to 12 percent slopes	21	IIIe-7	66	3	75	3
E1B2	Eleva sandy loam, 2 to 6 percent slopes, eroded	22	IIIs-4	66	3	75	1
E1C2	Eleva sandy loam, 6 to 12 percent slopes, eroded	22	IIIe-7	66	3	75	1
E1D2	Eleva sandy loam, 12 to 20 percent slopes, eroded	22	IVe-7	67	3	75	1
E1E2	Eleva sandy loam, 20 to 30 percent slopes, eroded	22	VIe-7	68	3	75	1
EnF	Eleva-Boone complex, 20 to 45 percent slopes	22	VIIe-7	69	3	75	3
EoE	Eleva-Gale complex, 20 to 30 percent slopes	22	VIe-2	67	1	75	1
Er	Ettrick silt loam	24	IIw-1	64	9	76	5b
Et	Ettrick silt loam, clayey subsoil variant	24	IIw-1	64	7	75	5b
FaB	Fayette silt loam, 2 to 6 percent slopes	25	IIe-1	63	1	75	1
FaC	Fayette silt loam, 6 to 12 percent slopes	25	IIIe-1	65	1	75	1

Map symbol	Mapping unit	Page	Capability unit		Woodland group		Wildlife group
			Symbol	Page	Number	Page	Number
FaC2	Fayette silt loam, 6 to 12 percent slopes, eroded	25	IIIe-1	65	1	75	1
FaD	Fayette silt loam, 12 to 20 percent slopes	26	IVe-1	66	1	75	1
FaD2	Fayette silt loam, 12 to 20 percent slopes, eroded	26	IVe-1	66	1	75	1
FaD3	Fayette silt loam, 12 to 20 percent slopes, severely eroded	26	VIe-1	67	1	75	1
FaE	Fayette silt loam, 20 to 30 percent slopes	26	VIe-1	67	1	75	1
GaB	Gale silt loam, 2 to 6 percent slopes	27	IIe-2	63	1	75	1
GaC	Gale silt loam, 6 to 12 percent slopes	27	IIIe-2	65	1	75	1
GaC2	Gale silt loam, 6 to 12 percent slopes, eroded	27	IIIe-2	65	1	75	1
GaD	Gale silt loam, 12 to 20 percent slopes	27	IVe-2	66	1	75	1
GaD2	Gale silt loam, 12 to 20 percent slopes, eroded	27	IVe-2	66	1	75	1
GlC2	Gale silt loam, shallow, 6 to 12 percent slopes, eroded	27	IVe-3	66	5	75	3
GlD2	Gale silt loam, shallow, 12 to 20 percent slopes, eroded	27	VIe-3	68	5	75	3
GlE2	Gale silt loam, shallow, 20 to 30 percent slopes, eroded	28	VIIe-3	69	5	75	3
GoA	Gotham loamy fine sand, 0 to 2 percent slopes	28	IVs-3	67	3	75	3
GoB	Gotham loamy fine sand, 2 to 6 percent slopes	28	IVs-3	67	3	75	3
GoC	Gotham loamy fine sand, 6 to 12 percent slopes	28	IVs-3	67	3	75	3
GoD2	Gotham loamy fine sand, 12 to 20 percent slopes, eroded	29	VIe-9	69	3	75	3
GpD	Gotham-Sparta loamy fine sands, 12 to 20 percent slopes	29	VIe-9	69	4	75	3
Gu	Gullied land	29	VIIIs-10	70	13	77	1
HnB2	Hixton loam, 2 to 6 percent slopes, eroded	30	IIe-2	63	1	75	1
HnC2	Hixton loam, 6 to 12 percent slopes, eroded	30	IIIe-2	65	1	75	1
HnD2	Hixton loam, 12 to 20 percent slopes, eroded	30	IVe-2	66	1	75	1
HnE2	Hixton loam, 20 to 30 percent slopes, eroded	30	VIe-2	67	1	75	1
HnF	Hixton loam, 30 to 45 percent slopes	30	VIIe-2	69	1	75	1
Ho	Houghton muck	31	IIIw-9	66	10	76	6
HuA	Huntsville silt loam, 0 to 3 percent slopes	32	IIw-11	64	12	76	7
KcA	Kato silt loam, 0 to 3 percent slopes	32	IIw-5	64	9	76	5b
Ka	Kato loam, sandy loam variant	33	IIw-5	64	7	75	5b
LfB2	La Farge silt loam, 2 to 6 percent slopes, eroded	34	IIe-2	63	1	75	1
LfC2	La Farge silt loam, 6 to 12 percent slopes, eroded	34	IIIe-2	65	1	75	1
LfD2	La Farge silt loam, 12 to 20 percent slopes, eroded	34	IVe-2	66	1	75	1
LfE	La Farge silt loam, 20 to 35 percent slopes	34	VIe-2	67	1	75	1
LfE2	La Farge silt loam, 20 to 30 percent slopes, eroded	35	VIe-2	67	1	75	1
LsA	Lawson silt loam, 0 to 3 percent slopes	35	IIw-13	65	9	76	7
Lv	Loamy alluvial land	35	IIw-13	65	1	75	7
Lx	Loamy terrace escarpments	36	VIIe-1	69	1	75	1
Ma	Marsh	36	VIIIw-15	70	10	76	5b
MdA	Meridian loam, 0 to 2 percent slopes	37	IIs-1	65	12	76	1
MdB	Meridian loam, 2 to 6 percent slopes	37	IIe-2	63	12	76	1
MdC2	Meridian loam, 6 to 12 percent slopes, eroded	37	IIIe-2	65	12	76	1

Map symbol	Mapping unit	Page	Capability unit		Woodland group		Wildlife group
			Symbol	Page	Number	Page	Number
MoA	Morocco loamy sand, 0 to 3 percent slopes	38	IVw-5	67	8	76	5a
MuA	Muscatine silt loam, 0 to 3 percent slopes	39	IIw-2	64	9	76	5a
NoC2	Norden loam, 4 to 12 percent slopes, eroded	39	IIIe-2	65	1	75	1
NoD2	Norden loam, 12 to 20 percent slopes, eroded	39	IVe-2	66	1	75	1
NrB2	Norden silt loam, 2 to 6 percent slopes, eroded	40	IIe-2	63	1	75	1
NrC2	Norden silt loam, 6 to 12 percent slopes, eroded	40	IIIe-2	65	1	75	1
NrD2	Norden silt loam, 12 to 20 percent slopes, eroded	40	IVe-2	66	1	75	1
NrE2	Norden silt loam, 20 to 30 percent slopes, eroded	40	VIe-2	67	1	75	1
Pa	Palms muck	41	IIw-8	64	10	76	6
PgB	Palsgrove silt loam, 2 to 6 percent slopes	42	IIe-1	63	1	75	1
PgC2	Palsgrove silt loam, 6 to 12 percent slopes, eroded	42	IIIe-1	65	1	75	1
PgD2	Palsgrove silt loam, 12 to 20 percent slopes, eroded	42	IVe-1	66	1	75	1
P1B	Palsgrove silt loam, clayey subsoil variant, 2 to 6 percent slopes	43	IIe-1	63	1	75	1
P1C	Palsgrove silt loam, clayey subsoil variant, 6 to 12 percent slopes	43	IIIe-1	65	1	75	1
P1D	Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes	43	IVe-1	66	1	75	1
P1D2	Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes, eroded	43	IVe-1	66	1	75	1
P1E	Palsgrove silt loam, clayey subsoil variant, 20 to 30 percent slopes	43	VIe-1	67	1	75	1
PnD3	Palsgrove soils, clayey subsoil variant, 12 to 20 percent slopes, severely eroded	43	VIe-1	67	1	75	1
PoA	Pillot silt loam, 0 to 2 percent slopes	44	IIs-1	65	12	76	4
PoB	Pillot silt loam, 2 to 6 percent slopes	44	IIe-2	63	12	76	4
PoC2	Pillot silt loam, 6 to 12 percent slopes, eroded	44	IIIe-2	65	12	76	4
PrB	Port Byron silt loam, 2 to 6 percent slopes	45	IIe-1	63	12	76	4
PrC2	Port Byron silt loam, 6 to 12 percent slopes, eroded	45	IIIe-1	65	12	76	4
PrD2	Port Byron silt loam, 12 to 20 percent slopes, eroded	45	IVe-1	66	12	76	4
PrE	Port Byron silt loam, 20 to 30 percent slopes	45	VIe-1	67	12	76	4
Sa	Sandy alluvial land	46	VIIs-9	70	3	75	7
Sd	Sandy terrace escarpments	46	VIIs-3	70	4	74	3
SeB	Seaton silt loam, 2 to 6 percent slopes	47	IIe-1	63	1	75	1
SeC	Seaton silt loam, 6 to 12 percent slopes	47	IIIe-1	65	1	75	1
SeC2	Seaton silt loam, 6 to 12 percent slopes, eroded	47	IIIe-1	65	1	75	1
SeD2	Seaton silt loam, 12 to 20 percent slopes, eroded	47	IVe-1	66	1	75	1
SeE	Seaton silt loam, 20 to 30 percent slopes	47	VIe-1	67	1	75	1
SeE2	Seaton silt loam, 20 to 30 percent slopes, eroded	47	VIe-1	67	1	75	1
ShA	Shiffer loam, 0 to 3 percent slopes	48	IIw-5	64	7	75	5a
SpA	Sparta loamy sand, 0 to 2 percent slopes	49	IVs-3	67	4	75	3
SpB	Sparta loamy sand, 2 to 6 percent slopes	49	IVs-3	67	4	75	3
SpC	Sparta loamy sand, 6 to 12 percent slopes	49	VIs-3	69	4	75	3
SrA	Sparta loamy fine sand, mottled subsoil variant, 0 to 3 percent slopes	50	IVw-5	67	8	76	5a

Map symbol	Mapping unit	Page	Capability unit		Woodland group		Wildlife group
			Symbol	Page	Number	Page	Number
St	Stony and rocky land	50	VIIs-6	70	13	77	8
TrA	Trempe loamy sand, 0 to 2 percent slopes	51	IVs-3	67	4	75	3
TrB	Trempe loamy sand, 2 to 6 percent slopes	51	IVs-3	67	4	75	3
TuA	Trempealeau loam, 0 to 3 percent slopes	52	IIs-1	65	12	76	4
TvA	Trempealeau loam, mottled subsoil variant, 0 to 3 percent slopes	53	IIw-5	64	12	76	5a
UfB	Urne fine sandy loam, 2 to 6 percent slopes	53	IIe-2	63	3	75	3
UfC2	Urne fine sandy loam, 6 to 12 percent slopes, eroded	54	IIIe-2	65	3	75	3
UfD2	Urne fine sandy loam, 12 to 20 percent slopes, eroded	54	IVe-2	66	3	75	3
UfE2	Urne fine sandy loam, 20 to 30 percent slopes, eroded	54	VIe-2	67	3	75	3
UfF	Urne fine sandy loam, 30 to 45 percent slopes	54	VIIe-2	69	3	75	3
UnC2	Urne silt loam, 6 to 12 percent slopes, eroded	54	IIIe-2	65	3	75	3
UnD2	Urne silt loam, 12 to 20 percent slopes, eroded	55	IVe-2	66	3	75	3
UnE2	Urne silt loam, 20 to 30 percent slopes, eroded	55	VIe-2	67	3	75	3
UrD2	Urne-Norden complex, 12 to 20 percent slopes, eroded	55	IVe-2	66	1	75	1
UrE	Urne-Norden complex, 20 to 30 percent slopes	55	VIe-2	67	1	75	1
UrF	Urne-Norden complex, 30 to 45 percent slopes	56	VIIe-2	69	1	75	1
WaA	Wallkill silt loam, 0 to 3 percent slopes	57	IIw-13	65	9	76	5b
We	Wet alluvial land	57	Vw-14	67	9	76	5b
WhA	Whitehall silt loam, 0 to 3 percent slopes	58	IIs-1	65	12	76	4
WoA	Worthen silt loam, 0 to 3 percent slopes	59	IIe-5	63	12	76	4

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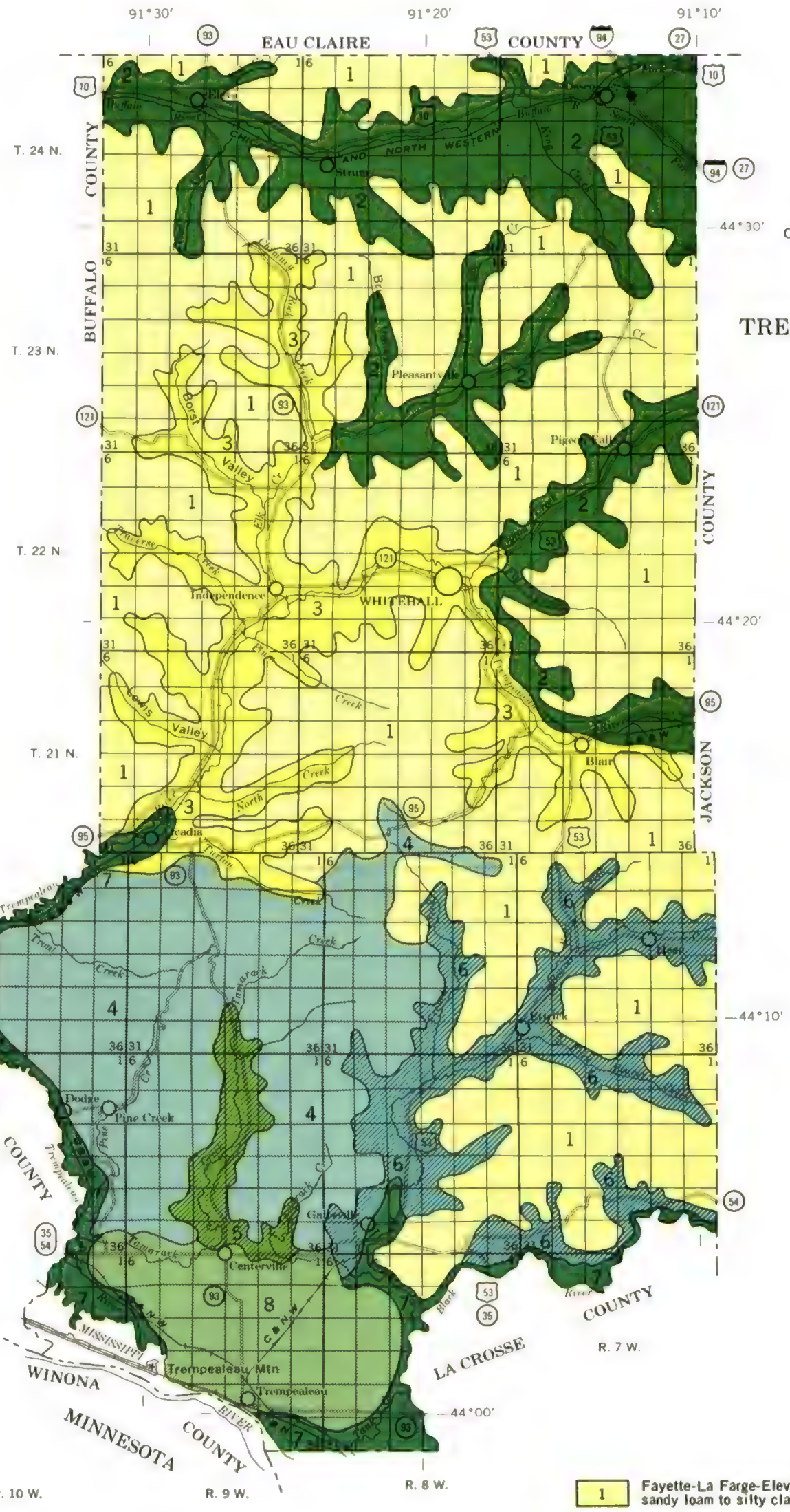
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

WISCONSIN RESEARCH DIVISION
COLLEGE OF AGRICULTURE AND LIFE SCIENCES
UNIVERSITY OF WISCONSIN

GENERAL SOIL MAP

TREMPEALEAU COUNTY, WISCONSIN

Scale 1:253,440
1 0 1 2 3 4 Miles



SOIL ASSOCIATIONS

1 Fayette-La Farge-Eleva association: Well-drained soils that have a subsoil of sandy loam to silty clay loam; moderately deep to deep over sandstone; on uplands

Billett-Sparta-Gotham association: Well drained to excessively drained soils that have a subsoil of sandy loam to loamy sand over sand; on stream and river terraces

3 Ettrick-Pillot-Meridian association: Poorly drained and well drained soils that have a subsoil of loam to silty clay loam over silt loam and sand; on valley bottoms or stream and river terraces

4 Stony and rocky land-Seaton-Palsgrove, clayey subsoil variant, association: Excessively drained to well drained soils that have a subsoil of loam, silt loam, silty clay loam, or clay; shallow and deep over limestone and sandstone; on uplands

5 Houghton-Palms association: Very poorly drained organic soils over organic and loamy sediment; along drainageways on valley bottoms

6 Downs-Boaz-Muscatine association: Well drained to poorly drained soils that have a subsoil of silt loam and silty clay loam over silt loam; on valley benches and valley bottoms

Wet alluvial land-Marsh association: Poorly drained soils, and very poorly drained soils under shallow water in places; on bottom lands and flood plains along rivers and streams

8 Dickinson-Gotham-Sparta association: Excessively drained to well drained soils that have a subsoil of loamy sand to fine sandy loam over fine to coarse sand; on river terraces

Compiled 1974

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

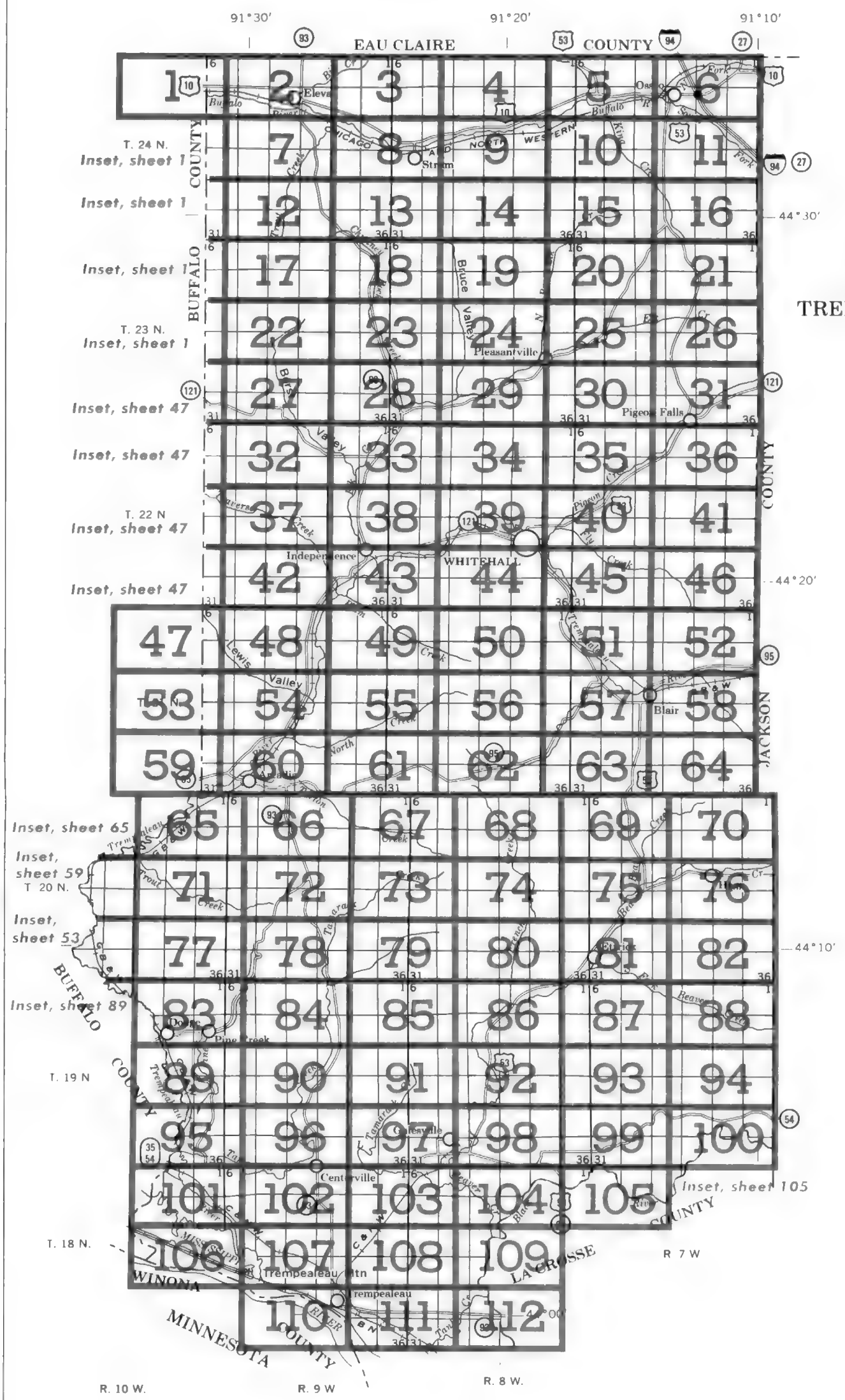
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

INDEX TO MAP SHEETS

TREMPEALEAU COUNTY, WISCONSIN

Scale 1:253,440

1 0 1 2 3 4 Miles



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, or F, indicates the class of slope. Most symbols without a slope letter are those of nearly level soils, but some are for land types that have a considerable range of slope. A final number, 2 or 3, in a symbol shows that the soil is named as eroded or severely eroded.

SYMBOL	NAME
BlA	Billett fine sandy loam, 0 to 2 percent slopes
BlB	Billett fine sandy loam, 2 to 6 percent slopes
BlC2	Billett fine sandy loam, 6 to 12 percent slopes, eroded
BlD2	Billett fine sandy loam, 12 to 20 percent slopes, eroded
BmA	Boaz silt loam, 0 to 3 percent slopes
BnB	Boone loamy sand, 2 to 6 percent slopes
BnC2	Boone loamy sand, 6 to 12 percent slopes, eroded
BnE2	Boone loamy sand, 12 to 30 percent slopes, eroded
Dc	Denrock silt loam
De	Denrock silt loam, wet subsoil variant
DkA	Dickinson fine sandy loam, 0 to 2 percent slopes
DkB	Dickinson fine sandy loam, 2 to 6 percent slopes
DlA	Dickinson loam, 0 to 3 percent slopes
DoA	Downs silt loam, 0 to 2 percent slopes
DoB	Downs silt loam, 2 to 6 percent slopes
DoC2	Downs silt loam, 6 to 12 percent slopes, eroded
DoD2	Downs silt loam, 12 to 20 percent slopes, eroded
DuA	Dunnville fine sandy loam, 0 to 2 percent slopes
DuB	Dunnville fine sandy loam, 2 to 6 percent slopes
DuC	Dunnville fine sandy loam, 6 to 12 percent slopes
ElB2	Eleva sandy loam, 2 to 6 percent slopes, eroded
ElC2	Eleva sandy loam, 6 to 12 percent slopes, eroded
ElD2	Eleva sandy loam, 12 to 20 percent slopes, eroded
ElE2	Eleva sandy loam, 20 to 30 percent slopes, eroded
EnF	Eleva-Boone complex, 20 to 45 percent slopes
EoE	Eleva-Gale complex, 20 to 30 percent slopes
Er	Ettrick silt loam
Et	Ettrick silt loam, clayey subsoil variant
FaB	Fayette silt loam, 2 to 6 percent slopes
FaC	Fayette silt loam, 6 to 12 percent slopes
FaC2	Fayette silt loam, 6 to 12 percent slopes, eroded
FaD	Fayette silt loam, 12 to 20 percent slopes
FaD2	Fayette silt loam, 12 to 20 percent slopes, eroded
FaD3	Fayette silt loam, 12 to 20 percent slopes, severely eroded
FaE	Fayette silt loam, 20 to 30 percent slopes
GaB	Gale silt loam, 2 to 6 percent slopes
GaC	Gale silt loam, 6 to 12 percent slopes
GaC2	Gale silt loam, 6 to 12 percent slopes, eroded
GaD	Gale silt loam, 12 to 20 percent slopes
GaD2	Gale silt loam, 12 to 20 percent slopes, eroded
GlC2	Gale silt loam, shallow, 6 to 12 percent slopes, eroded
GlD2	Gale silt loam, shallow, 12 to 20 percent slopes, eroded
GlE2	Gale silt loam, shallow, 20 to 30 percent slopes, eroded
GoA	Gotham loamy fine sand, 0 to 2 percent slopes
GoB	Gotham loamy fine sand, 2 to 6 percent slopes
GoC	Gotham loamy fine sand, 6 to 12 percent slopes
GoD2	Gotham loamy fine sand, 12 to 20 percent slopes, eroded
GpD	Gotham-Sparta loamy fine sands, 12 to 20 percent slopes
Gu	Gullied land
HnB2	Hixton loam, 2 to 6 percent slopes, eroded
HnC2	Hixton loam, 6 to 12 percent slopes, eroded
HnD2	Hixton loam, 12 to 20 percent slopes, eroded
HnE2	Hixton loam, 20 to 30 percent slopes, eroded
HnF	Hixton loam, 30 to 45 percent slopes
Ho	Houghton muck
HuA	Huntsville silt loam, 0 to 3 percent slopes
Ka	Kato loam, sandy loam variant
KcA	Kato silt loam, 0 to 3 percent slopes
LfB2	La Farge silt loam, 2 to 6 percent slopes, eroded
LfC2	La Farge silt loam, 6 to 12 percent slopes, eroded
LfD2	La Farge silt loam, 12 to 20 percent slopes, eroded
LfE	La Farge silt loam, 20 to 35 percent slopes
LfE2	La Farge silt loam, 20 to 30 percent slopes, eroded
LsA	Lawson silt loam, 0 to 3 percent slopes
Lv	Loamy alluvial land
Lx	Loamy terrace escarpments
Ma	Marsh
MdA	Meridian loam, 0 to 2 percent slopes
MdB	Meridian loam, 2 to 6 percent slopes
MdC2	Meridian loam, 6 to 12 percent slopes, eroded
MoA	Morocco loamy sand, 0 to 3 percent slopes
MuA	Muscatine silt loam, 0 to 3 percent slopes
NoC2	Norden loam, 4 to 12 percent slopes, eroded
NoD2	Norden loam, 12 to 20 percent slopes, eroded
NrB2	Norden silt loam, 2 to 6 percent slopes, eroded
NrC2	Norden silt loam, 6 to 12 percent slopes, eroded
NrD2	Norden silt loam, 12 to 20 percent slopes, eroded
NrE2	Norden silt loam, 20 to 30 percent slopes, eroded
Pa	Palms muck
PgB	Palsgrove silt loam, 2 to 6 percent slopes
PgC2	Palsgrove silt loam, 6 to 12 percent slopes, eroded
PgD2	Palsgrove silt loam, 12 to 20 percent slopes, eroded
PlB	Palsgrove silt loam, clayey subsoil variant, 2 to 6 percent slopes
PlC	Palsgrove silt loam, clayey subsoil variant, 6 to 12 percent slopes
PlD	Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes
PlD2	Palsgrove silt loam, clayey subsoil variant, 12 to 20 percent slopes, eroded
PlE	Palsgrove silt loam, clayey subsoil variant, 20 to 30 percent slopes
PnD3	Palsgrove soils, clayey subsoil variant, 12 to 20 percent slopes, severely eroded
PoA	Pillot silt loam, 0 to 2 percent slopes
PoB	Pillot silt loam, 2 to 6 percent slopes
PoC2	Pillot silt loam, 6 to 12 percent slopes, eroded
PrB	Port Byron silt loam, 2 to 6 percent slopes
PrC2	Port Byron silt loam, 6 to 12 percent slopes, eroded
PrD2	Port Byron silt loam, 12 to 20 percent slopes, eroded
PrE	Port Byron silt loam, 20 to 30 percent slopes
Sa	Sandy alluvial land
Sd	Sandy terrace escarpments
SeB	Seaton silt loam, 2 to 6 percent slopes
SeC	Seaton silt loam, 6 to 12 percent slopes
SeC2	Seaton silt loam, 6 to 12 percent slopes, eroded
SeD2	Seaton silt loam, 12 to 20 percent slopes, eroded
SeE	Seaton silt loam, 20 to 30 percent slopes
SeE2	Seaton silt loam, 20 to 30 percent slopes, eroded
ShA	Shiffer loam 0 to 3 percent slopes
SpA	Sparta loamy sand, 0 to 2 percent slopes
SpB	Sparta loamy sand, 2 to 6 percent slopes
SpC	Sparta loamy sand, 6 to 12 percent slopes
SrA	Sparta loamy fine sand, mottled subsoil variant, 0 to 3 percent slopes
St	Stony and rocky land
TrA	Trempe loamy sand, 0 to 2 percent slopes
TrB	Trempe loamy sand, 2 to 6 percent slopes
TuA	Trempealeau loam, 0 to 3 percent slopes
TvA	Trempealeau loam, mottled subsoil variant, 0 to 3 percent slopes
UfB	Urne fine sandy loam, 2 to 6 percent slopes
UfC2	Urne fine sandy loam, 6 to 12 percent slopes, eroded
UfD2	Urne fine sandy loam, 12 to 20 percent slopes, eroded
UfE2	Urne fine sandy loam, 20 to 30 percent slopes, eroded
UfF	Urne fine sandy loam, 30 to 45 percent slopes
UnC2	Urne silt loam, 6 to 12 percent slopes, eroded
UnD2	Urne silt loam, 12 to 20 percent slopes, eroded
UnE2	Urne silt loam, 20 to 30 percent slopes, eroded
UrD2	Urne-Norden complex, 12 to 20 percent slopes, eroded
UrE	Urne-Norden complex, 20 to 30 percent slopes
UrF	Urne-Norden complex, 30 to 45 percent slopes
WaA	Wallkill silt loam, 0 to 3 percent slopes
We	Wet alluvial land
WhA	Whitehall silt loam, 0 to 3 percent slopes
WoA	Worthern silt loam, 0 to 3 percent slopes

TREMPEALEAU COUNTY, WISCONSIN

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Buildings
- School
- Church

Mine and quarry (QU.)

Gravel pit (G.P.)

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Windmill

Located object

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end or alluvial fan

RELIEF

Escarpments
- Bedrock
- Other

Short steep slope

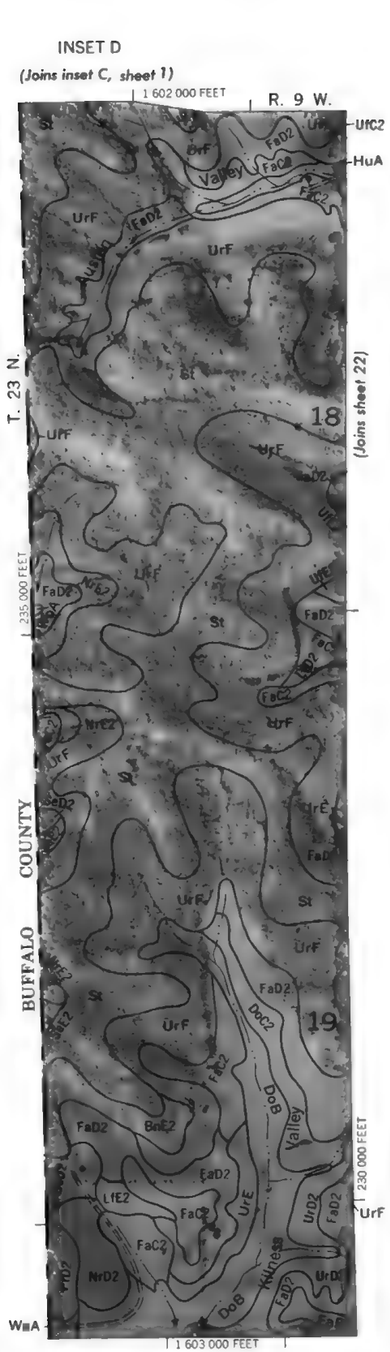
Prominent peak

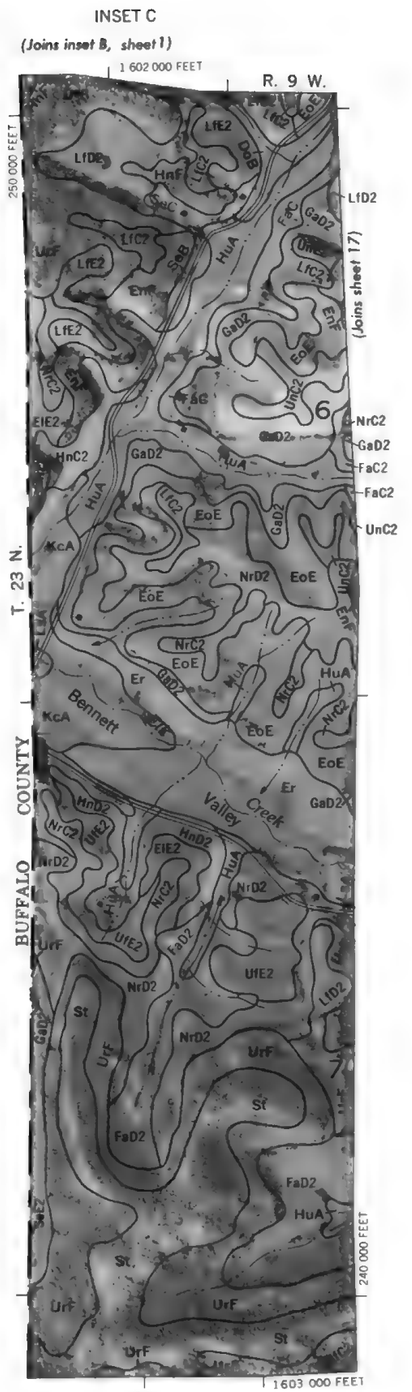
Depressions

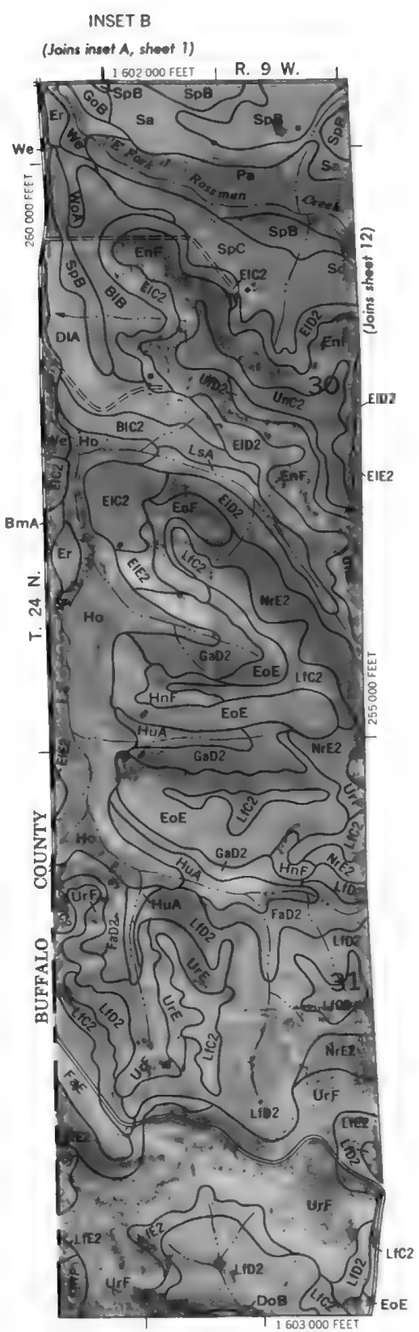
	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

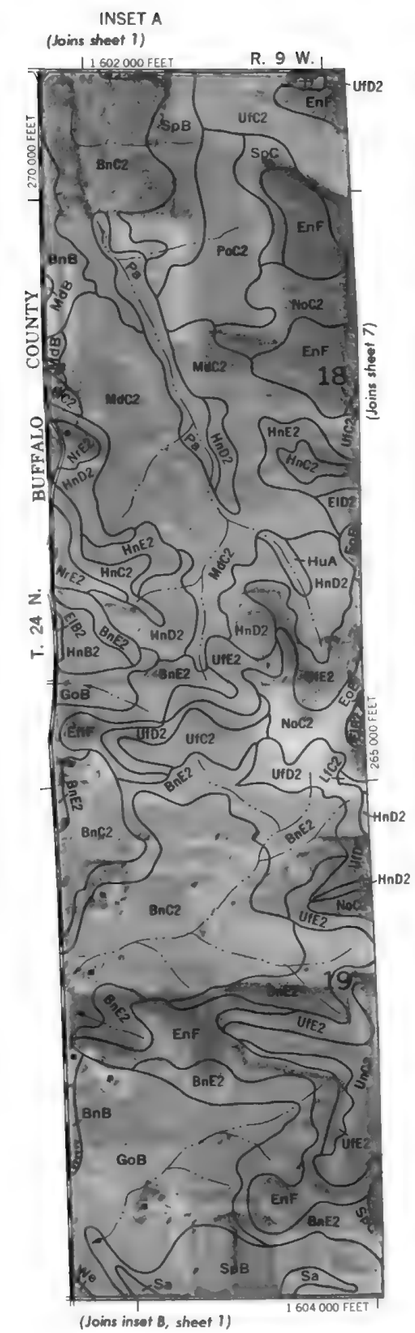
SOIL SURVEY DATA

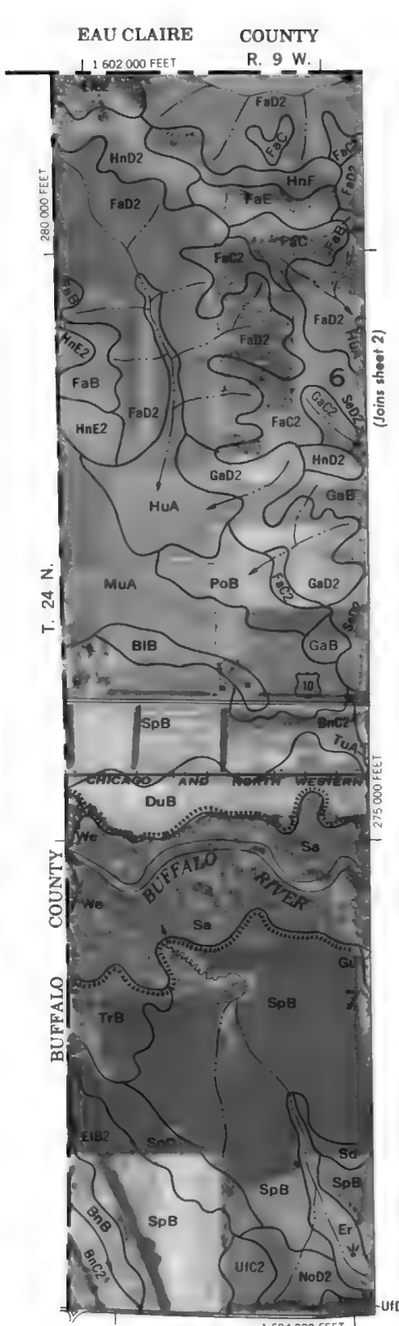
- Soil boundary and symbol (Dx)
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Borrow pit (B.P.)











TREMPEALEAU COUNTY, WISCONSIN NO. 1

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 2

N

1 Mile
5000 Feet

Scale 1: 15 840

EAU CLAIRE COUNTY

R. 9 W.

1 620 000 FEET

280 000 FEET

T. 24 N.

(Joins sheet 1)

(Joins sheet 3)

1 275 000 FEET

1 605 000 FEET

(Joins sheet 7)

NoC2

EIB2

BUFFALO RIVER

CHICAGO AND NORTH WESTERN

Elgin

Valley

Creek

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN NO. 2

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 3

EAU CLAIRE COUNTY

R. 9 W. | R. 8 W.

T. 24 N.

1 625 000 FEET

280 000 FEET

1 640 000 FEET

275 000 FEET

(Joins sheet 2)

(Joins sheet 4)

(Joins sheet 8)

N

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN NO. 3

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 4

N

1 Mile

5000 Feet

Scale 1: 15 840

EAU CLAIRE COUNTY

R. 8 W.

T. 24 N.

1 655 000 FEET

280 000 FEET

275 000 FEET

1 645 000 FEET

(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 9)

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 4

TREMPEALEAU COUNTY, WISCONSIN NO. 5

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

R. 8 W. | R. 7 W.

EAU CLAIRE COUNTY

1 660 000 FEET

280 000 FEET

T. 24 N.

(Joins sheet 4)

(Joins sheet 6)

(Joins sheet 10)

1 675 000 FEET

275 000 FEET

Buffalo River

Creek

WESTERN

CHICAGO AND NORTH

OSSEO

5

N

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 6

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

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TREMPEALEAU COUNTY, WISCONSIN NO. 6

INDEX TO SOIL SURVEY MAPS
WISCONSIN NO. 7
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.
Photobase from 1972 aerial photography. Positions of 5 000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 8

8

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 ¼ 1000 ½ 2000 ¾ 3000 1 4000 5000

R. 9 W. | R. 8 W.

T. 24 N.

1 640 000 FEET

270 000 FEET

265 000 FEET

1 625 000 FEET

(Joins sheet 3)

(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 13)

BUFFALO RIVER

CHICAGO AND NORTH WESTERN

STRUM LAKE

Strum

Johnson Valley

Berg Valley

Trout Creek

13 14 17 18 19 20 23 24

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

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TREMPEALEAU COUNTY, WISCONSIN NO. 8

TREMPEALEAU COUNTY, WISCONSIN NO. 9

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Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 10

(10)

N

1 Mile

5000 Feet

Scale 1: 15 840

R. 8 W. | R. 7 W.

T. 24 N.

(Joins sheet 5)

(Joins sheet 9)

(Joins sheet 11)

(Joins sheet 15)

1 675 000 FEET

270 000 FEET

265 000 FEET

1 660 000 FEET

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

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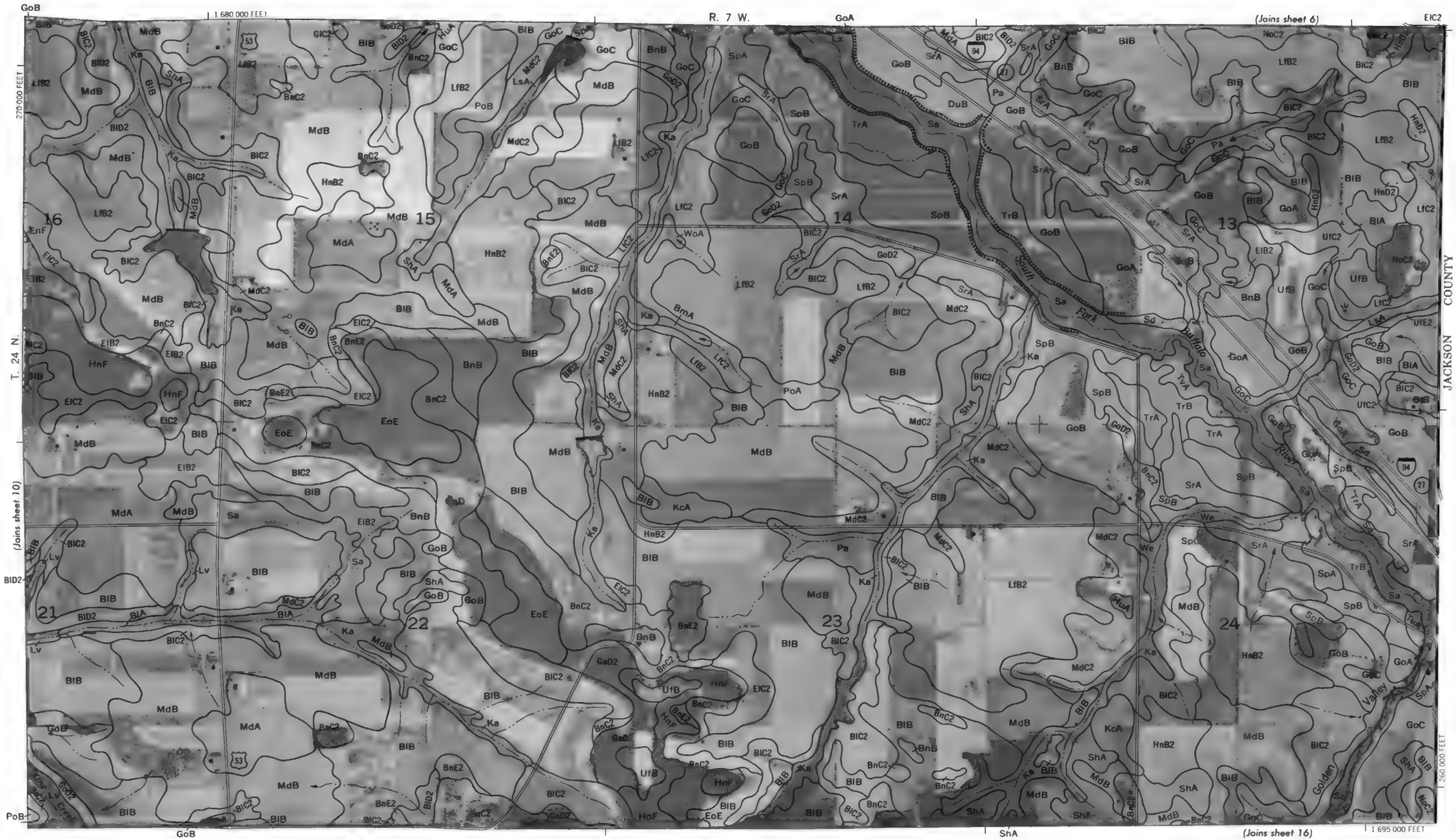
TREMPEALEAU COUNTY, WISCONSIN NO. 10

TREMPEALEAU COUNTY, WISCONSIN NO. 11
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map



12

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 1/4 1000 1/2 2000 3/4 4000 1 5000

R. 9 W.

T. 24 N.

(Joins sheet 7)

(Joins inset B, sheet 1)

(Joins sheet 13)

(Joins sheet 17)

1 620 000 FEET

260 000 FEET

255 000 FEET

1 605 000 FEET

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

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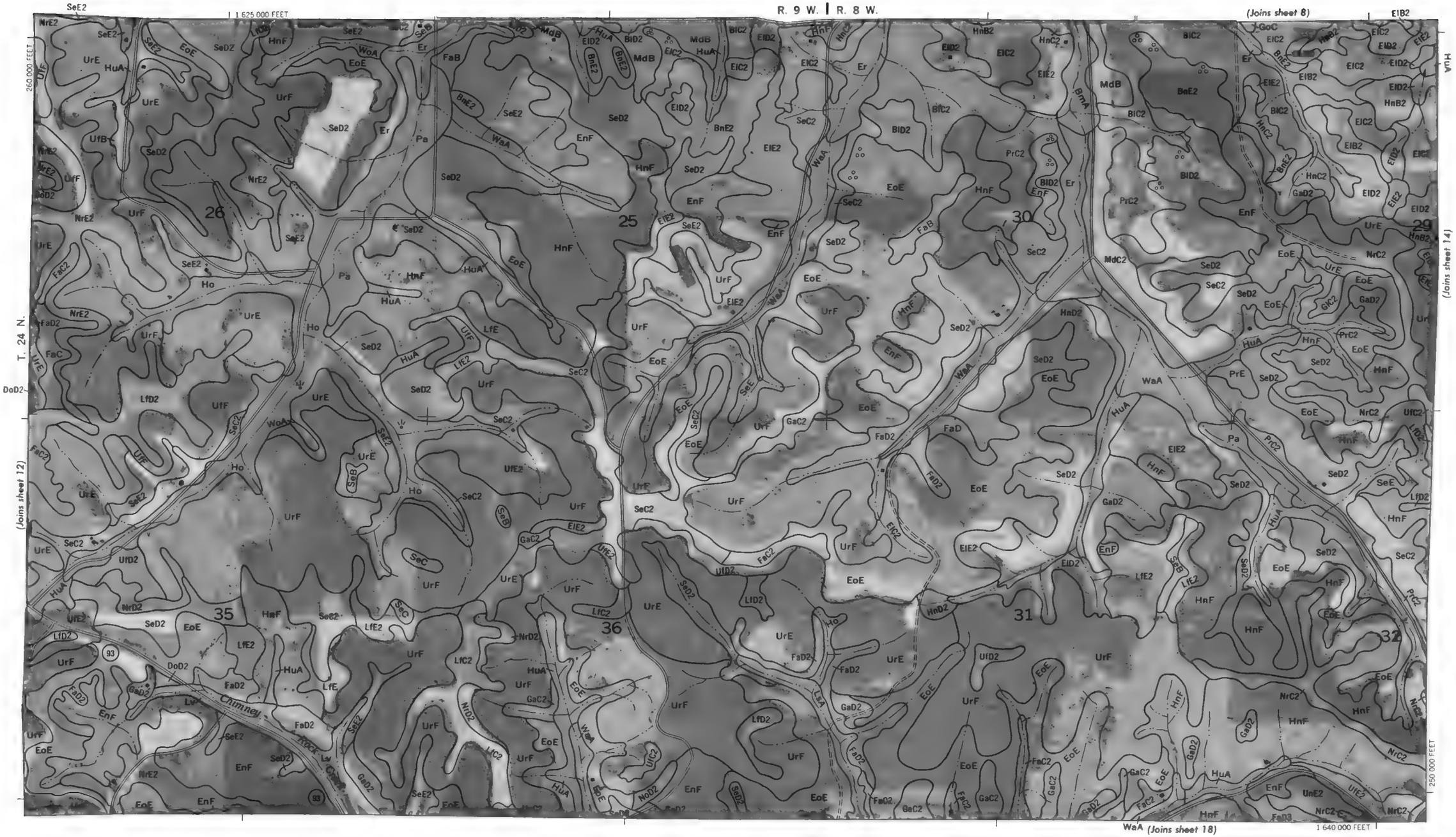
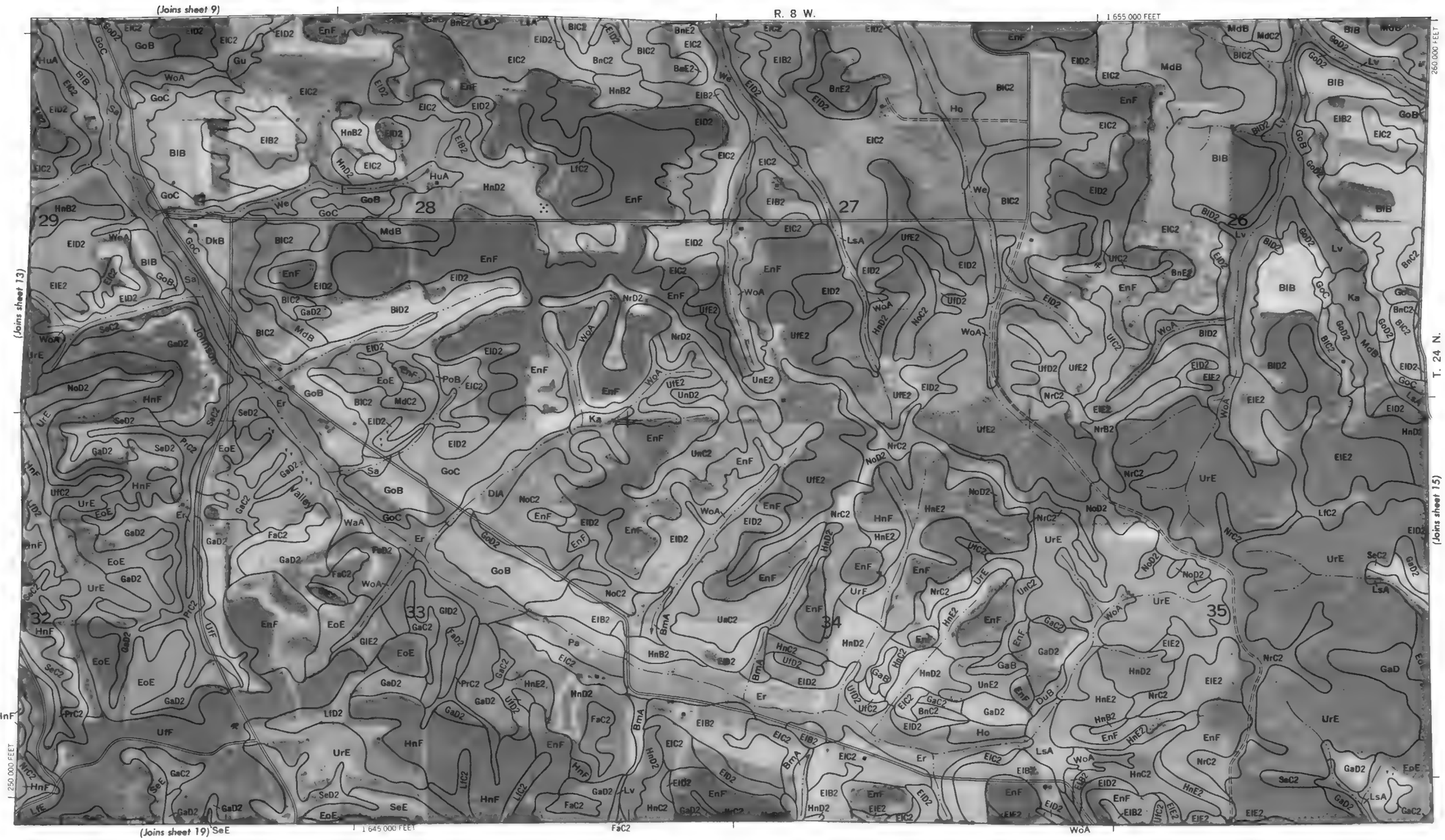
TREMPEALEAU COUNTY, WISCONSIN NO. 12

TREMPEALEAU COUNTY, WISCONSIN NO. 13
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map





14

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 1/4 1000 1/2 2000 3/4 3000 4000 5000 1

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

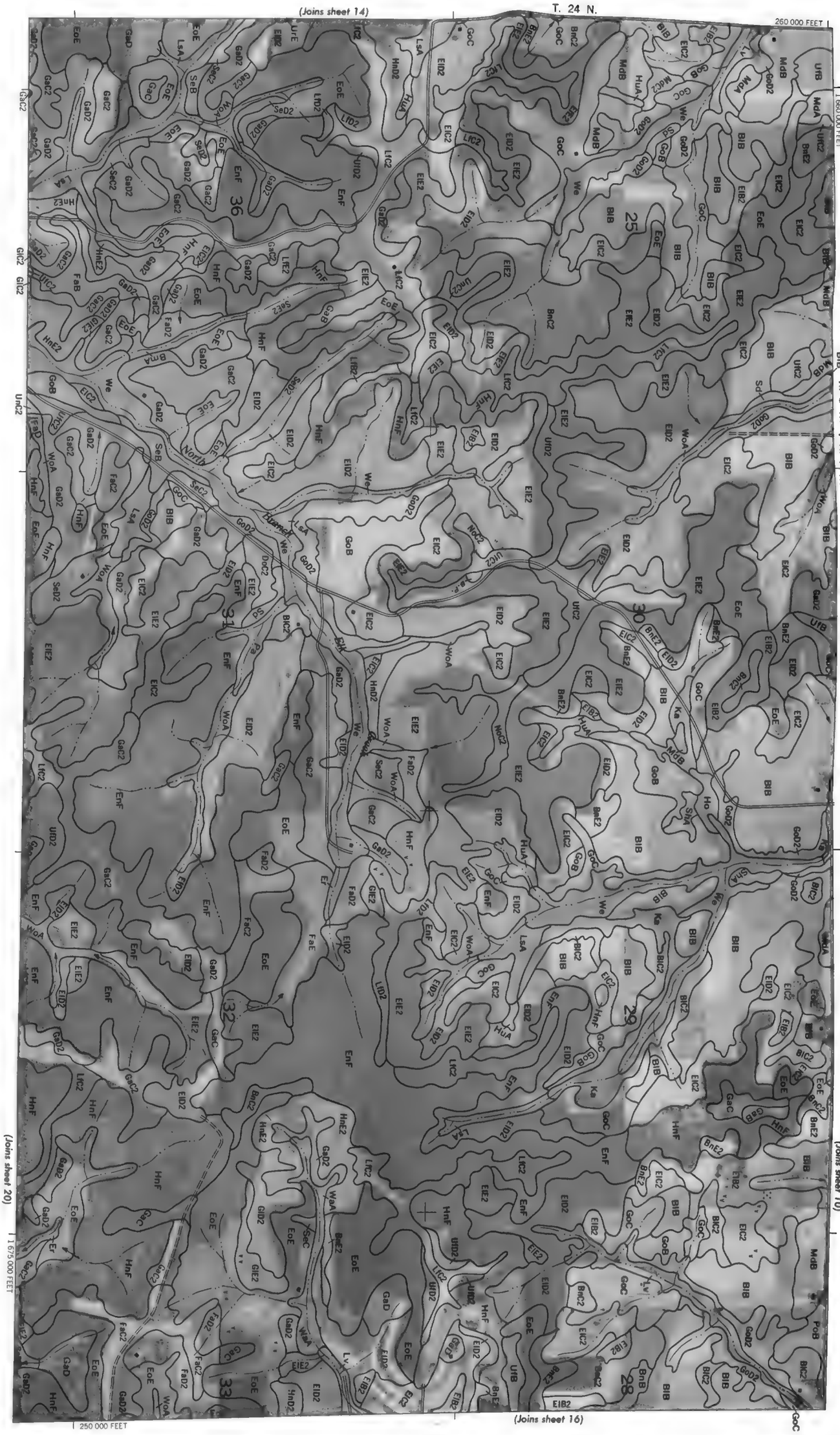
TREMPEALEAU COUNTY, WISCONSIN NO. 14

TREMPEALEAU COUNTY, WISCONSIN NO. 15

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map



1 Mile

5000 4000 3000 2000 1000 0 5000 Feet

Scale 1: 15 840

N

15

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 15

16

N

1 Mile

5000 Feet

Scale 1: 15 840

(Joins sheet 11)

R. 7 W.

1 695 000 FEET

T. 24 N.

255 000 FEET

(Joins sheet 15)

(Joins sheet 21)

1 680 000 FEET

250 000 FEET

JACKSON COUNTY

28 27 26 25 33 34 35 36

53

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 16

TREMPEALEAU COUNTY, WISCONSIN NO. 17

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

18

N

1 Mile 5000 Feet

Scale 1: 15 840

0 0 ¼ 1000 ½ 2000 ¾ 4000 1 5000

(Joins sheet 13)

R. 9 W. | R. 8 W.

1 640 000 FEET

T. 23 N. | 245 000 FEET

(Joins sheet 17)

(Joins sheet 19)

240 000 FEET

1 625 000 FEET

(Joins sheet 23)

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 18

N

TREMPEALEAU COUNTY, WISCONSIN NO. 19

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 20

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 20

N

TREMPEALEAU COUNTY, WISCONSIN NO. 21

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

1 680 000 FEET

R. 7 W.

(Joins sheet 16)

245 000 FEET

T. 23 N.

(Joins sheet 20)

(Joins sheet 26)

1 695 000 FEET

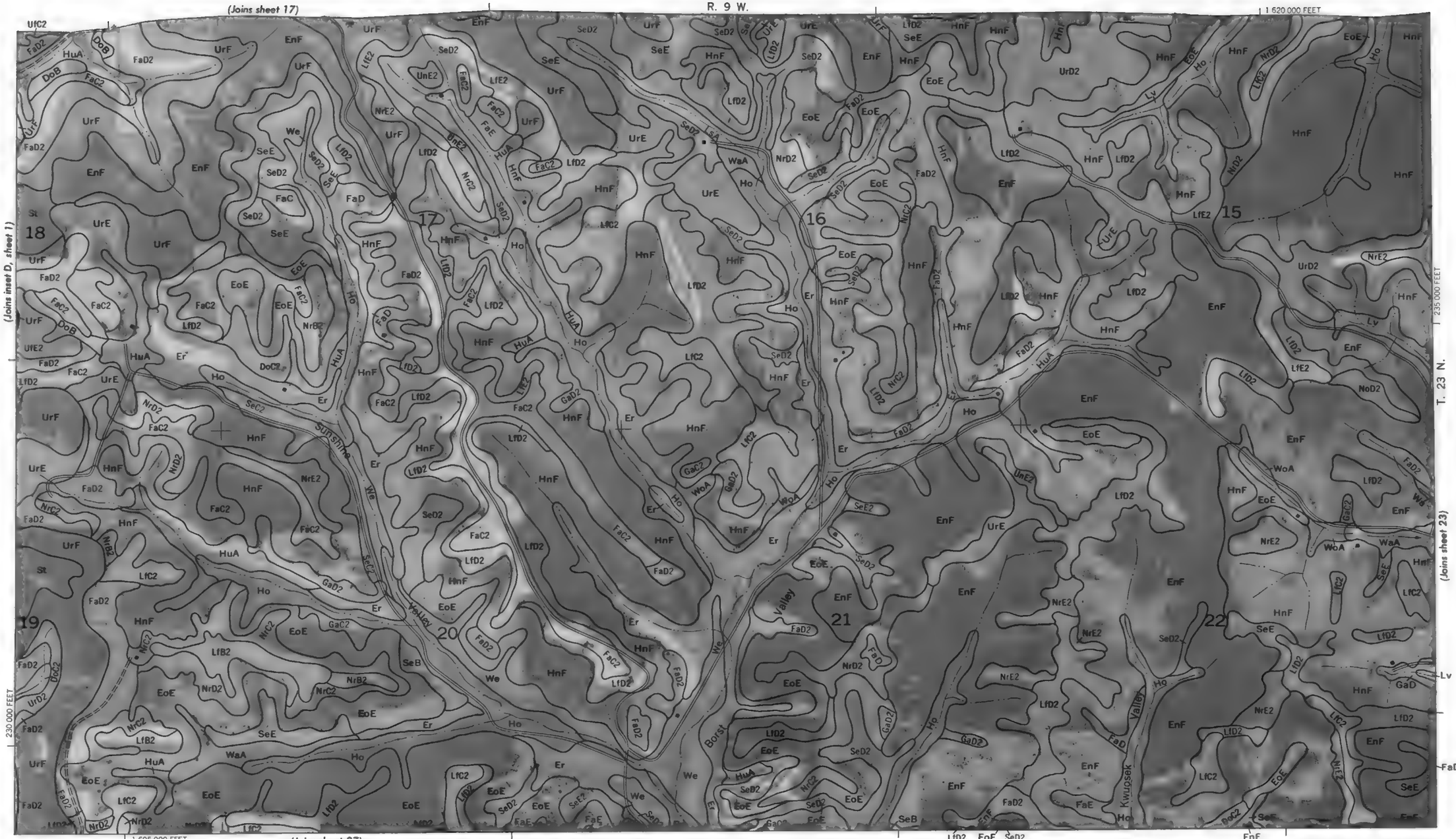
1 240 000 FEET

JACKSON COUNTY

1 Mile

5000 Feet

Scale 1: 15 840



Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 22

TREMPEALEAU COUNTY, WISCONSIN NO. 23
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

23
N
1 Mile
5000 Feet
Scale 1: 15 840
0
¼
½
¾
1
1000
2000
3000
4000
5000

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 24

TREMPEALEAU COUNTY, WISCONSIN NO. 25

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

25

N

1 Mile

5000 Feet

Scale 1: 15 840

Land division corners are approximately positioned on this map
Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system central zone
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin
Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

N

R. 9 W.

1 605 000 FEET

1 620 000 FEET

T. 23 N.

225 000 FEET

220 000 FEET

(Joins sheet 22)

(Joins sheet 28)

(Joins sheet 32)

(Joins inset D, sheet 47)

Borst

Valley

Russell

Sport

Johnson

Ho Valley

30 29 28 27 31 32 33 34

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN NO. 27

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 28

28

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0

¼ 1000

½ 2000

¾ 4000

1 5000

(Joins sheet 23)

R. 9 W. | R. 8 W.

1 640 000 FEET

225 000 FEET

T. 23 N.

(Joins sheet 27)

(Joins sheet 29)

220 000 FEET

(Joins sheet 33)

1 625 000 FEET

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

TREMPEALEAU COUNTY, WISCONSIN NO. 28

TREMPEALEAU COUNTY, WISCONSIN NO. 29
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 30

30

N

R. 8 W. | R. 7 W.

(Joins sheet 25)

(Joins sheet 29)

(Joins sheet 31)

(Joins sheet 35)

1 675 000 FEET

1 660 000 FEET

225 000 FEET

220 000 FEET

T. 23 N.

1 Mile

5000 Feet

Scale 1: 15 840

0 1000 2000 3000 4000 5000

0 ¼ ½ ¾ 1

Land division corners are approximately positioned on the map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 30

TREMPEALEAU COUNTY, WISCONSIN NO. 31

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography

Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

(Joins sheet 30)

(Joins sheet 26)

(Joins sheet 36)

R. 7 W.

T. 23 N.

1 680 000 FEET

225 000 FEET

220 000 FEET

1 695 000 FEET

Pigeon Falls

JACKSON COUNTY

Scale 1: 15 840

1 Mile

5000 Feet

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 32

TREMPEALEAU COUNTY, WISCONSIN NO. 33

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

34

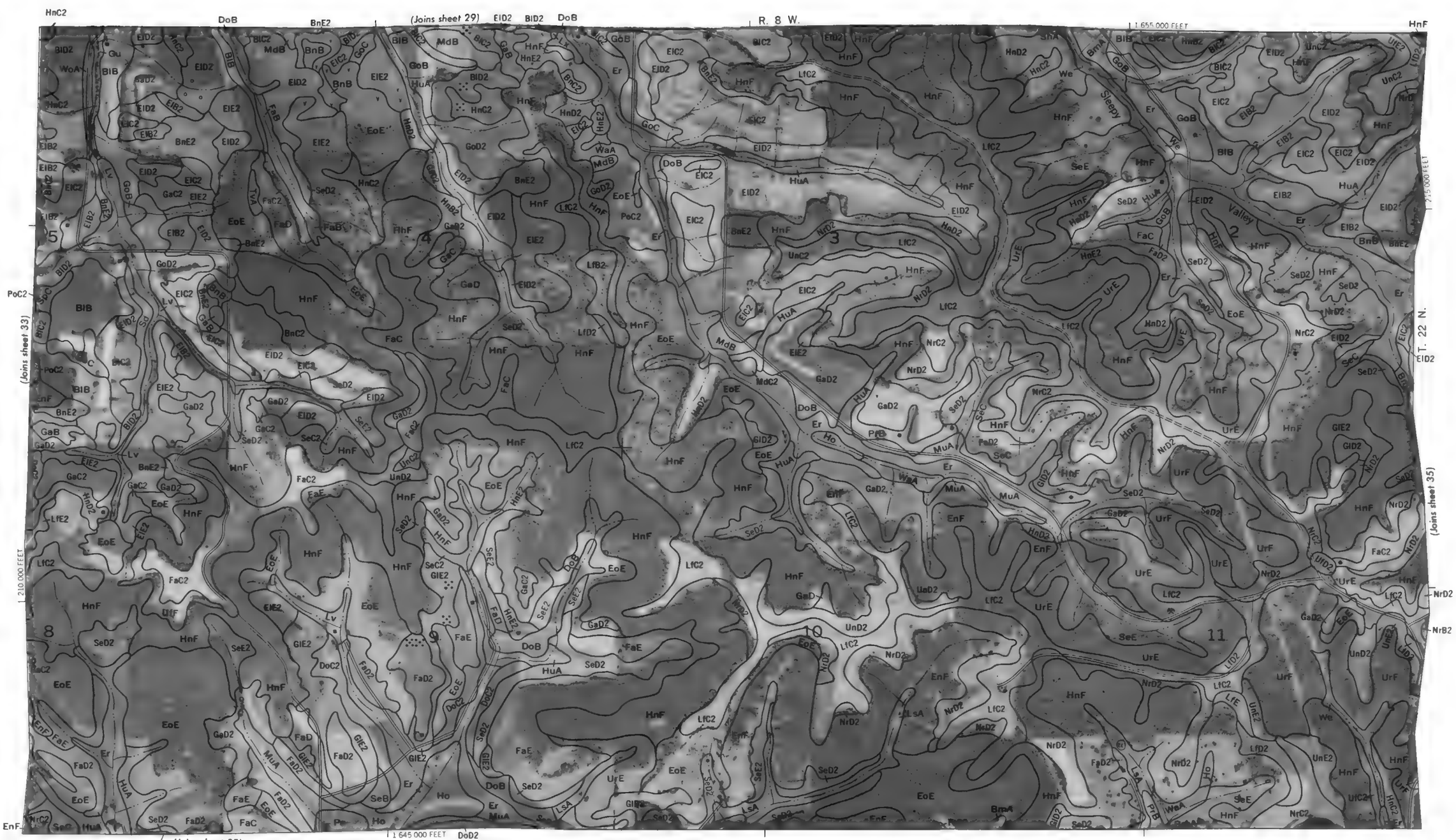
N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 ¼ 1000 ½ 2000 ¾ 4000 1 5000



Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5 000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 34

TREMPEALEAU COUNTY, WISCONSIN NO. 35

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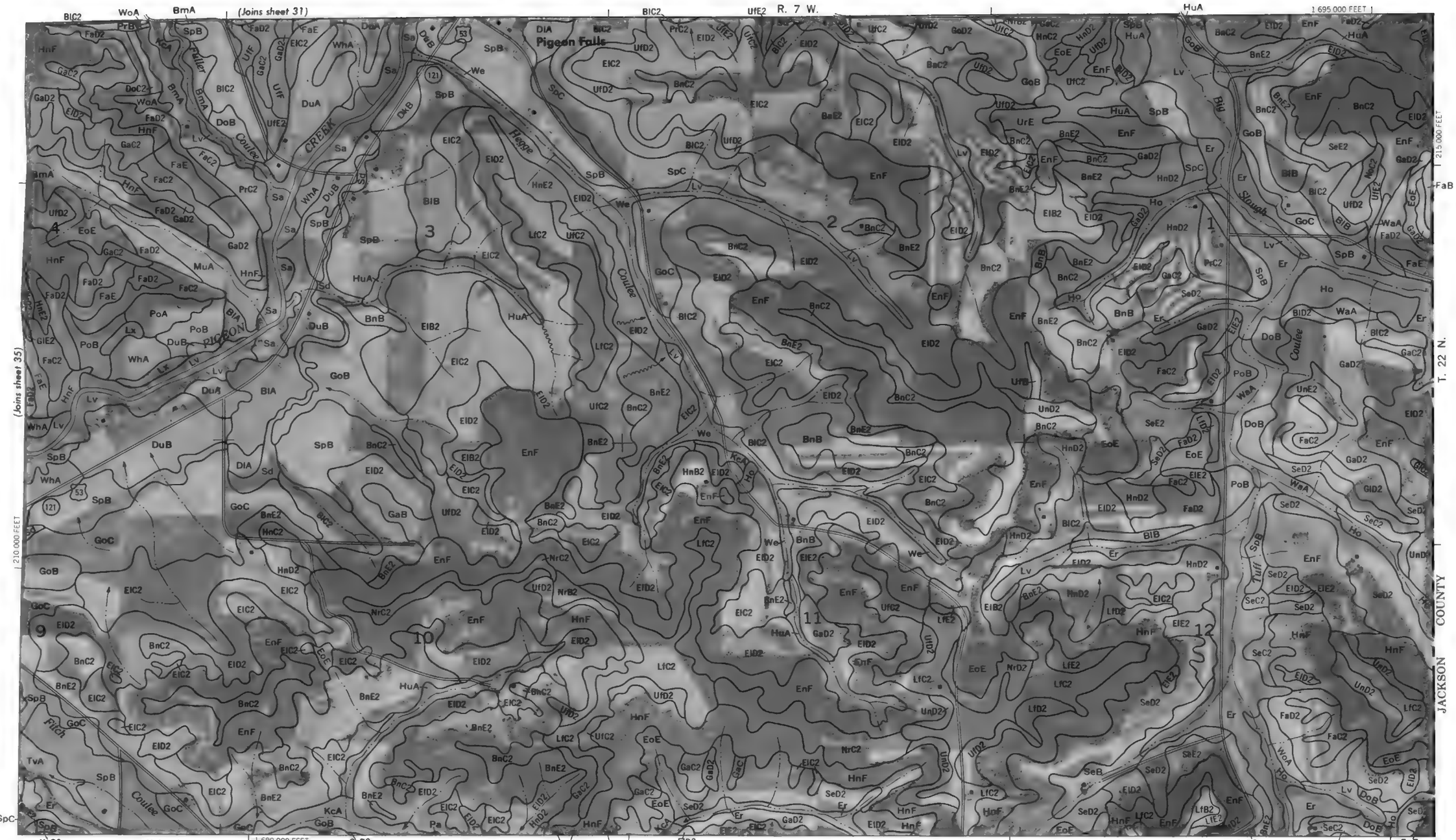
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

Land division corners are approximately positioned on this map.



Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 36

N

TREMPEALEAU COUNTY, WISCONSIN NO. 37
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

1 605 000 FEET

205 000 FEET

R. 9 W.

T. 22 N.

FaD2 (Joins sheet 32)

(Joins sheet 38)

(Joins sheet 47)

(Joins sheet 42)

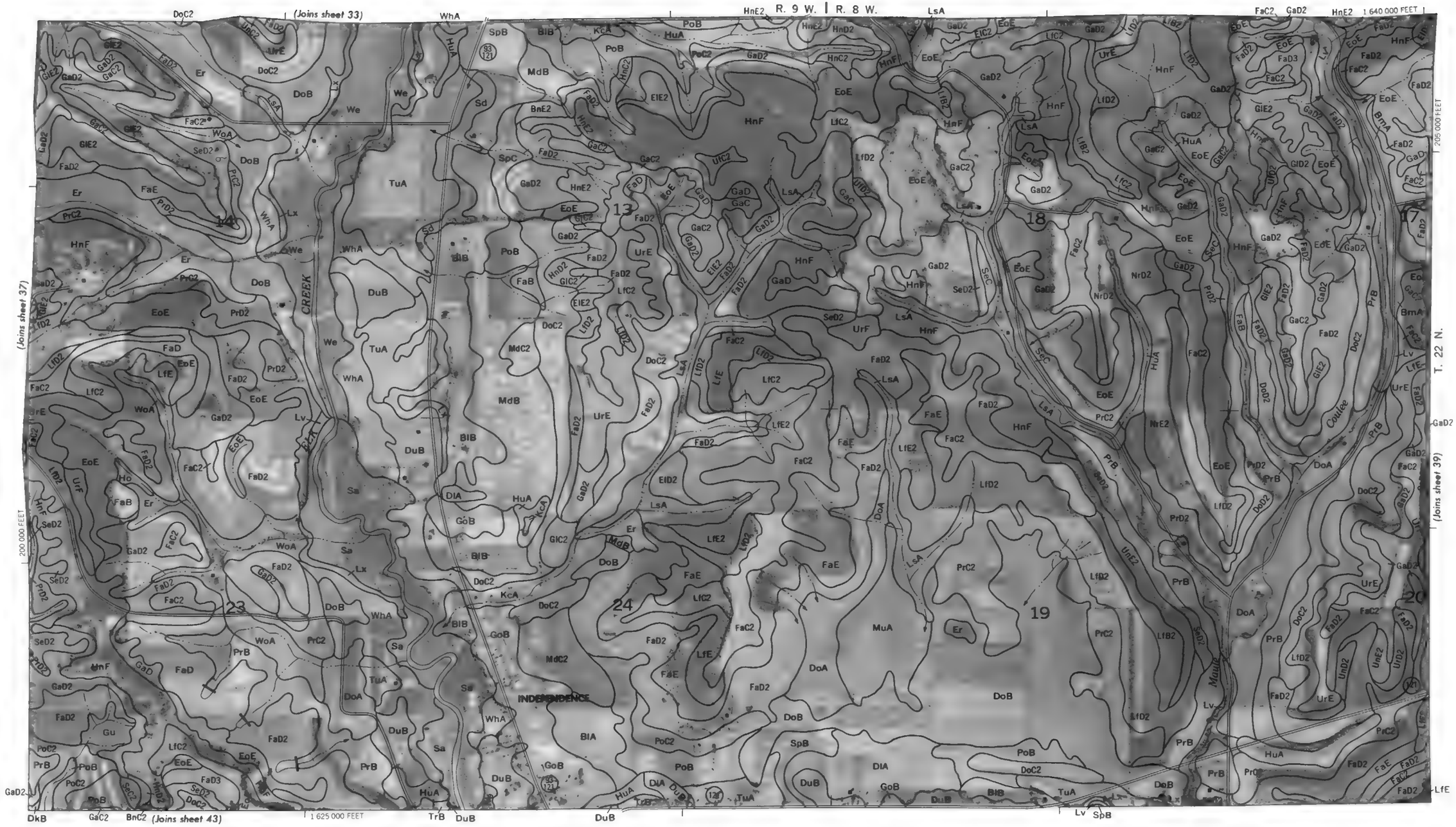
1 620 000 FEET

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 38



1 Mile
5000 Feet
Scale 1: 15 840

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 38

TREMPEALEAU COUNTY, WISCONSIN NO. 39
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map

39

N

R. 8 W.

1 645 000 FEET

205 000 FEET

T. 22 N.

(Joins sheet 34)

(Joins sheet 38)

(Joins sheet 40)

(Joins sheet 44)

1 655 000 FEET

200 000 FEET

TREMPEALEAU RIVER

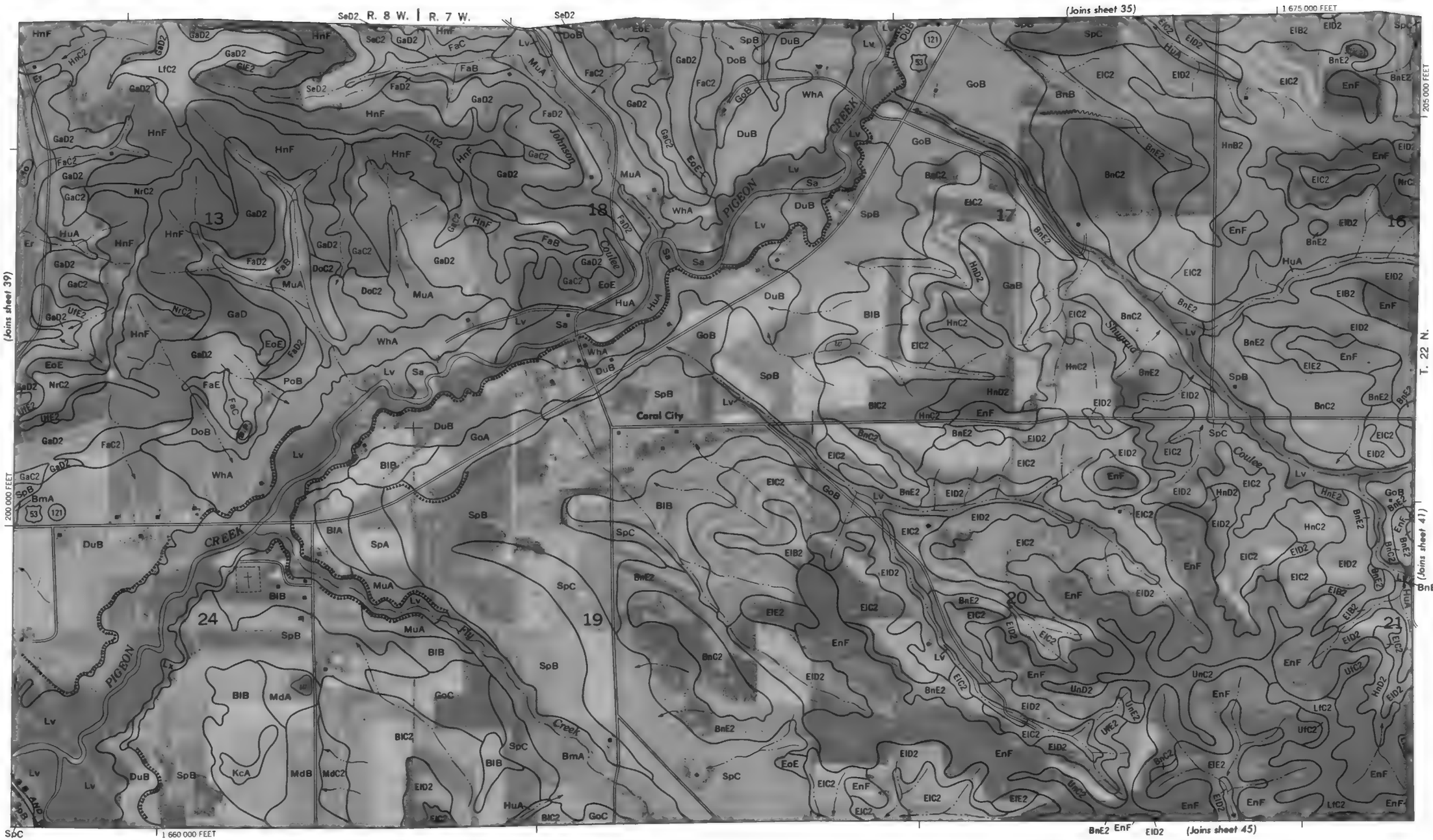
GREEN BAY AND WESTERN

WHITE HALL (county seat)

1 Mile

5000 Feet

Scale 1: 15 840



Land division corners are approximately positioned on the map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 40

TREMPEALEAU COUNTY, WISCONSIN NO. 41
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 42

TREMPEALEAU COUNTY, WISCONSIN NO. 43

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 44

(44)

N

Scale 1: 15 840

1 Mile 5000 Feet

0 0 1/4 1/2 3/4 1

1 000 FEET 2000 3000 4000 5000

1 640 000 FEET

195 000 FEET

190 000 FEET

R. 8 W.

T. 22 N.

(Joins sheet 39)

(Joins sheet 43)

(Joins sheet 45)

(Joins sheet 50)

TREMPEALEAU

WHITE HALL (county seat)

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 44

TREMPEALEAU COUNTY, WISCONSIN NO. 45
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

46

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 ¼ ½ ¾ 1

1000 2000 3000 4000 5000

(Joins sheet 41)

(Joins sheet 45)

(Joins sheet 52)

R. 7 W.

1 695 000 FEET

1 690 000 FEET

1 680 000 FEET

T. 22 N.

JACKSON COUNTY

Coulee

Creek

Vosse

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

TREMPEALEAU COUNTY, WISCONSIN NO. 46

TREMPEALEAU COUNTY, WISCONSIN NO. 47

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system central zone
Land division corners are approximately positioned on this map

INSET D

(Joins inset D, sheet 1)

R. 9 W. | 1 602 000 FEET

T. 23 N. | 225 000 FEET

BUFFALO COUNTY

T. 22 N.

1 603 000 FEET

(Joins inset C, sheet 47)

1000 AND 5000-FOOT GRID TICKS

INSET C

(Joins inset D, sheet 47)

R. 9 W. | 1 601 000 FEET

215 000 FEET

210 000 FEET

1 603 000 FEET

(Joins inset B, sheet 47)

2000 AND 5000 FOOT GRID TICKS

INSET B

(Joins inset C, sheet 47)

R. 9 W. | 1 601 000 FEET

205 000 FEET

200 000 FEET

1 603 000 FEET

(Joins inset A, sheet 47)

2000 AND 5000 FOOT GRID TICKS

INSET A

(Joins inset B, sheet 47)

R. 9 W. | 1 601 000 FEET

195 000 FEET

190 000 FEET

1 602 000 FEET

(Joins sheet 47)

1000 AND 5000 FOOT GRID TICKS

(Joins inset A, sheet 47)

R. 9 W. | 1 601 000 FEET

185 000 FEET

180 000 FEET

1 602 000 FEET

(Joins sheet 53)

1000 AND 5000-FOOT GRID TICKS

47

N

1 Mile

5000 Feet

Scale 1: 15 840

48

N

1 Mile

5000 Feet

Scale 1: 15 840

R. 9 W.

T. 21 N.

(Joins sheet 42)

(Joins sheet 47)

(Joins sheet 49)

(Joins sheet 54)

1 620 000 FEET

1 605 000 FEET

185 000 FEET

180 000 FEET

Land divisions are approximately restored on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set completed in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 48

TREMPEALEAU COUNTY, WISCONSIN NO. 49
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate until based on the Wisconsin coordinate system: central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 50

TREMPEALEAU COUNTY, WISCONSIN NO. 51

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system central zone

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 52

52

N

(Joins sheet 46)

R. 7 W.

1 690 000 FEET

185 000 FEET

T. 21 N.

JACKSON COUNTY

(Joins sheet 51)

(Joins sheet 58)

1 680 000 FEET

175 000 FEET

1 Mile

5000 Feet

Scale 1: 15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

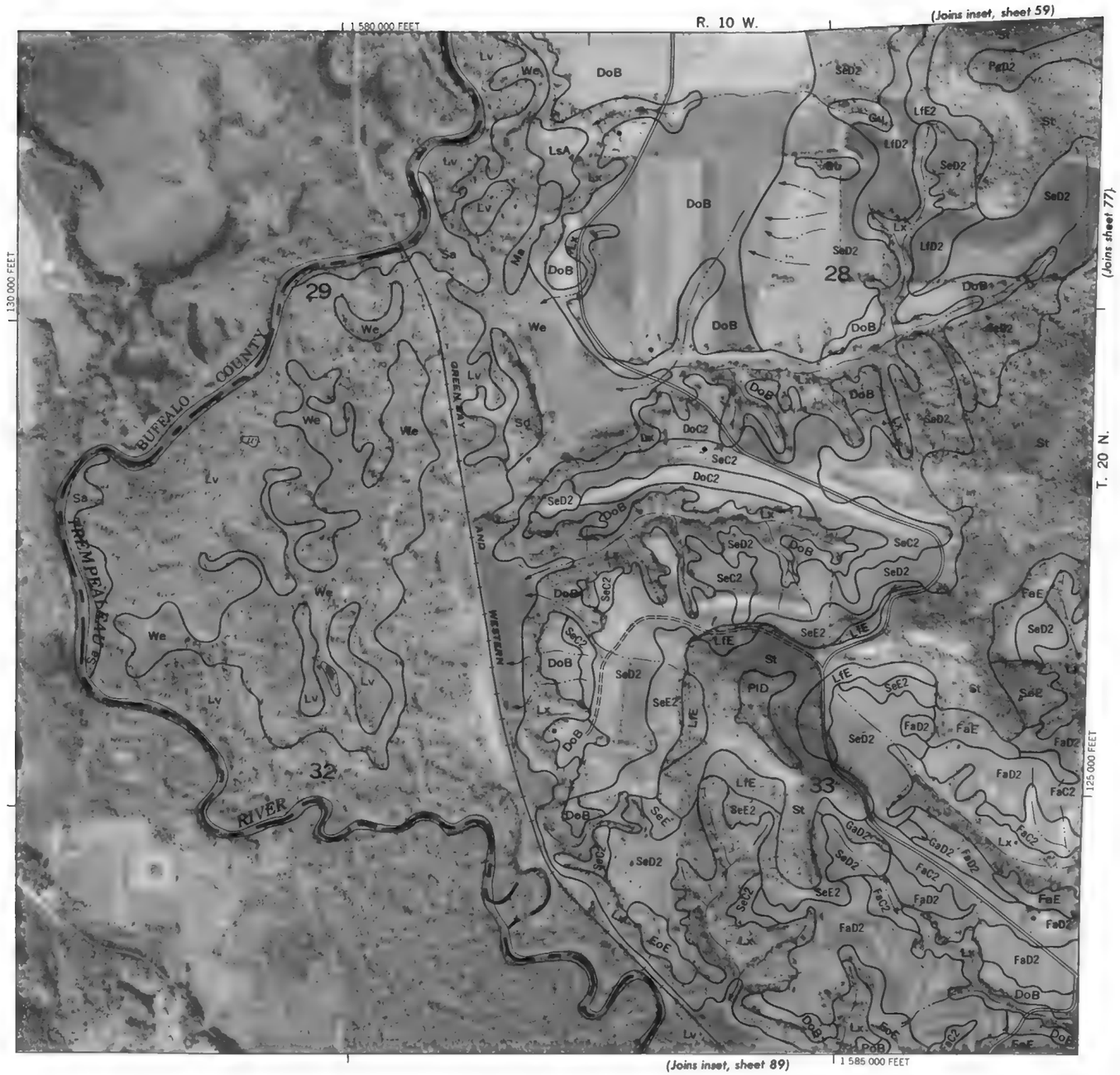
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

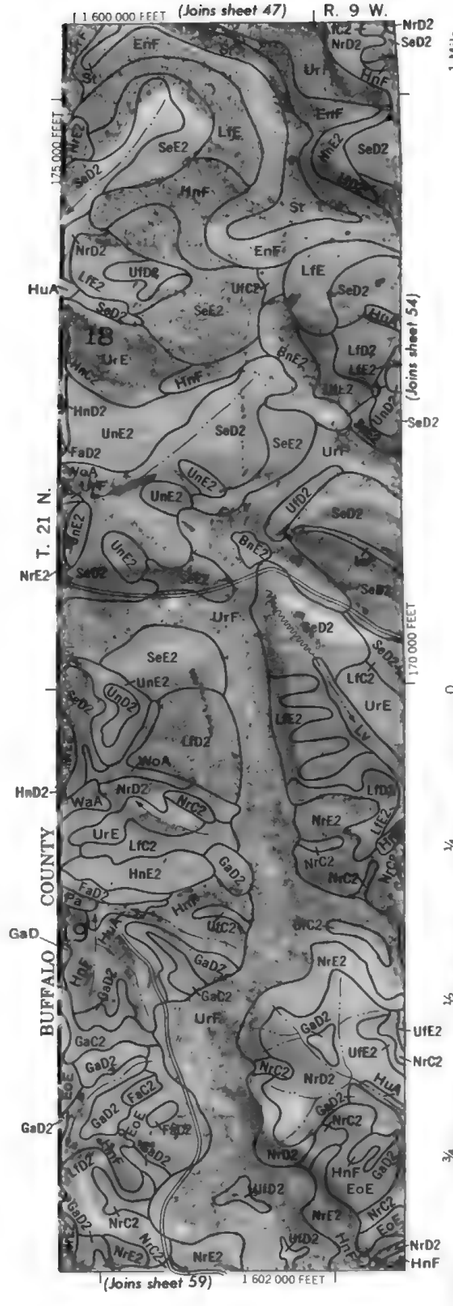
TREMPEALEAU COUNTY, WISCONSIN NO. 52

TREMPEALEAU COUNTY, WISCONSIN NO. 53

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone Land division corners are approximately positioned on this map





TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 54

54

N

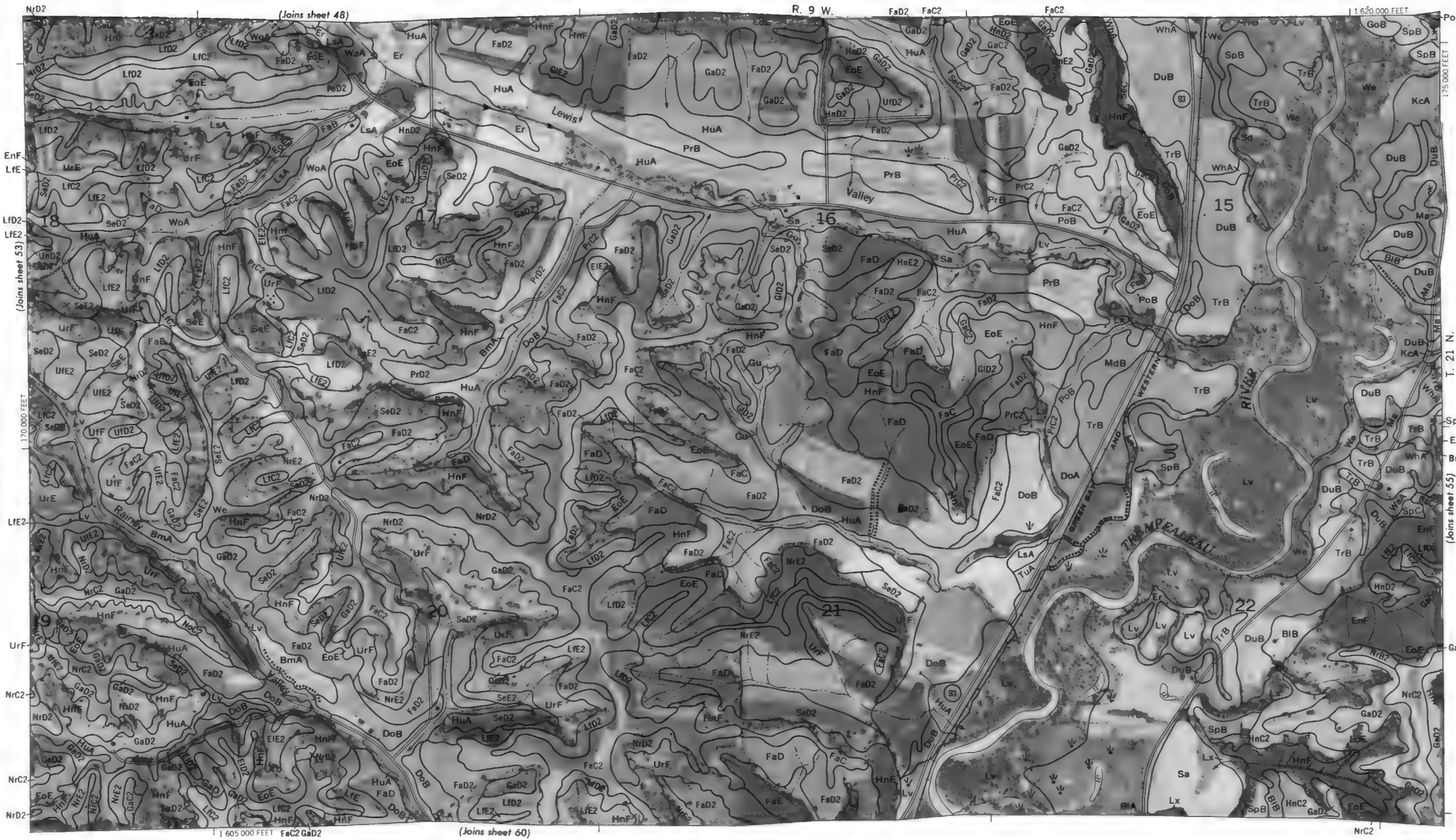
1 Mile

5000 Feet

Scale 1: 15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

TREMPEALEAU COUNTY, WISCONSIN NO. 54

N

TREMPEALEAU COUNTY, WISCONSIN NO. 55

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

56

N

(Joins sheet 50)

R. 8 W.

1 655 000 FEET

1 170 000 FEET

T. 21 N.

(Joins sheet 57)

(Joins sheet 55)

1 165 000 FEET

1 640 000 FEET

(Joins sheet 62)

North Creek

Coulee

Valley

Peterson

Scale 1: 15 840

1 Mile

5000 Feet

0 1000 2000 3000 4000 5000

TREMPEALEAU COUNTY, WISCONSIN NO. 56

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin

Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN NO. 57
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

58

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0

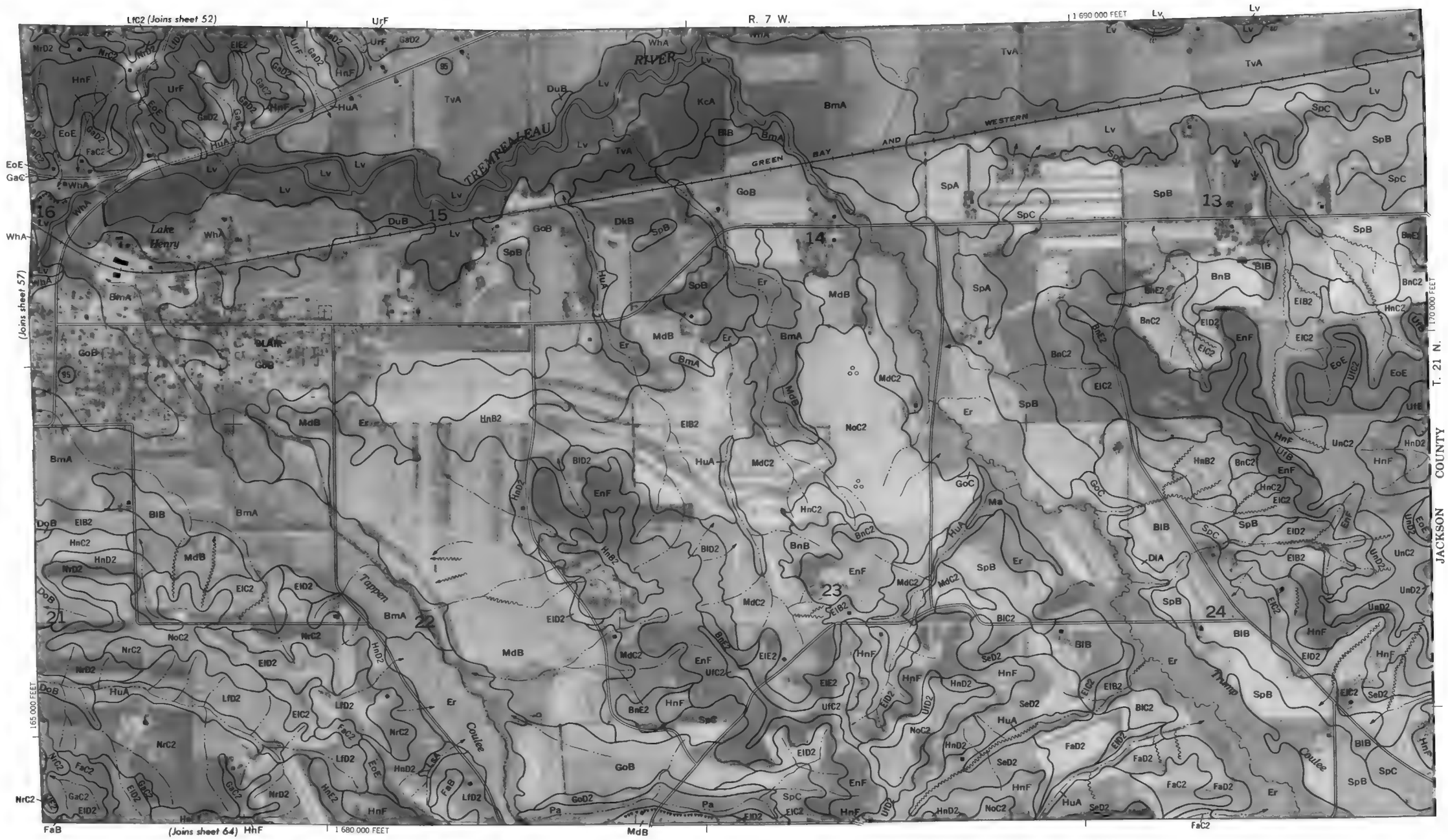
¼ 1 000

½ 2000

¾ 3000

1 4000

5000



Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin
Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 58

TREMPEALEAU COUNTY, WISCONSIN NO. 59

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 60

TREMPEALEAU COUNTY, WISCONSIN NO. 61

This map is one of a set compiled in 1974 as part of a soil survey, by the United States Department of Agriculture Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

*This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

WISCONSIN NO. 62

TREMPEALEAU COUNTY, WISCONSIN

TREMPEALEAU COUNTY, WISCONSIN NO. 63

*This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone and division corners are approximately positioned on this map

R. 8 W. | R. 7 W.

T. 21 N.

1 660 000 FEET

160 000 FEET

(Joins sheet 57)

(Joins sheet 62)

(Joins sheet 64)

(Joins sheet 68) | (Joins sheet 69)

1 675 000 FEET

155 000 FEET

25 30 29 28 31 32 33 36

Coulee Lakes Reynolds Coulee

63

N

1 Mile

5000 Feet

Scale 1: 15 840

0 1/4 1/2 3/4 1

0 1000 2000 3000 4000 5000

64

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 ¼ 1000 ½ 2000 ¾ 4000 1 5000

(Joins sheet 58) R. 7 W. 1 690 000 FEET

(Joins sheet 63) 160 000 FEET

T. 21 N.

155 000 FEET

(Joins sheet 69) 1 680 000 FEET (Joins sheet 70)

JACKSON COUNTY, WISCONSIN

TREMPEALEAU COUNTY, WISCONSIN NO. 64

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 65

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone Land division corners are approximately positioned on this map

1 590 000 FEET

1 585 000 FEET

1 588 000 FEET

1 605 000 FEET

150 000 FEET

145 000 FEET

140 000 FEET

R. 10 W.

R. 9 W.

T. 20 N.

(Joins inset, sheet 59)

(Joins sheet 59)

(Joins sheet 60)

(Joins sheet 65)

(Joins sheet 66)

(Joins sheet 71)

(Joins inset)

1000 AND 3000-FOOT GRID TICKS

N

1 Mile

5000 Feet

Scale 1: 15 840

Land division corners are approximately positioned on this map.
Photobase from 1972 aerial photography. Positions of 5 000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

N

R. 9 W. | R. 8 W.

(Joins sheet 61) | (Joins sheet 62)

1 625 000 FEET

T. 20 N.

150 000 FEET

(Joins sheet 66)

(Joins sheet 68)

145 000 FEET

(Joins sheet 73)

1 640 000 FEET

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN NO. 67

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.
Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone, and division corners are approximately positioned on this map.

68

N

1 Mile 5000 Feet

Scale 1: 15 840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

R. 8 W.

T. 20 N.

(Joins sheet 67)

(Joins sheet 62)

(Joins sheet 63)

(Joins sheet 69)

(Joins sheet 74)

1 660 000 FEET

1 650 000 FEET

1 645 000 FEET

1 645 000 FEET

Upper French Creek School

French Creek

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5 000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 68

69

TREMPEALEAU COUNTY, WISCONSIN NO. 69

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

Land division corners are approximately positioned on this map.

70

N

1 Mile

5000 Feet

Scale 1: 15 840

(Joins sheet 64)

R. 7 W.

1 695 000 FEET

150 000 FEET

145 000 FEET

1 680 000 FEET

(Joins sheet 69)

(Joins sheet 76)

T. 20 N.

JACKSON COUNTY

TREMPEALEAU COUNTY, WISCONSIN NO. 70

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 71
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

71
N
1 Mile
5000 Feet
Scale 1: 15 840

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Elevation is zone of 4 feet, computed in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 72

TREMPEALEAU COUNTY, WISCONSIN NO. 73
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

73

N

1 Mile

5000 Feet

Scale 1: 15 840

74

N

1 Mile

5 000 Feet

Scale 1: 15 840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

R. 8 W.

T. 20 N.

(Joins sheet 68)

(Joins sheet 73)

(Joins sheet 75)

(Joins sheet 80)

1 660 000 FEET

1 640 000 FEET

1 645 000 FEET

1 635 000 FEET

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 74

TREMPEALEAU COUNTY, WISCONSIN NO. 75

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

R. 8 W. | R. 7 W.

1 665 000 FEET

1 140 000 FEET

T. 20 N.

(Joins sheet 69)

(Joins sheet 74)

(Joins sheet 76)

(Joins sheet 81)

1 675 000 FEET

135 000 FEET

Beaver Creek

Beaches Corners

B.P.

13 18 17 16 24 19 20 21

75

N

1 Mile

5000 Feet

Scale 1: 15 840

76

N

1 Mile

5000 Feet

Scale 1: 15 840

(Joins sheet 70)

R. 7 W.

1 695 000 FEET

140 000 FEET

T. 20 N.

(Joins sheet 75)

135 000 FEET

(Joins sheet 82)

1 685 000 FEET

JACKSON COUNTY

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 76

TREMPEALEAU COUNTY, WISCONSIN NO. 77

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

1 Mile
5000 Feet
Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 78

78

N

1 Mile

5000 Feet

Scale 1: 15 840

(Joins sheet 72)

R. 9 W.

1 620 000 FEET

1 130 000 FEET

T. 20 N.

(Joins sheet 77)

(Joins sheet 79)

1 125 000 FEET

(Joins sheet 84)

1 610 000 FEET

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 78

TREMPEALEAU COUNTY, WISCONSIN NO. 79

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN – SHEET NUMBER 79

1 Mile

5000 4000 3000 2000 1000 0 5000 Feet

Scale 1: 15 840

N

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 80

80

N

1 Mile

5 000 Feet

Scale 1: 15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

(Joins sheet 74)

(Joins sheet 79)

(Joins sheet 86)

(Joins sheet 81)

R. 8 W.

T. 20 N.

1 660 000 FEET

1 650 000 FEET

1 645 000 FEET

1 640 000 FEET

125 000 FEET

130 000 FEET

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000 foot grid ticks are approximate and based on the Wisconsin coordinate system: central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 80

TREMPEALEAU COUNTY, WISCONSIN NO. 81
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

82

N

1 Mile
5000 Feet

Scale 1: 15 840

(Joins sheet 76)

R. 7 W.

1 695 000 FEET

1 680 000 FEET

125 000 FEET

130 000 FEET

T. 20 N.

JACKSON COUNTY

(Joins sheet 81)

EoE (Joins sheet 88)

Land division corners are approximately positioned on the map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 82

TREMPEALEAU COUNTY, WISCONSIN NO. 83

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 84

(84)

N

1 Mile

5000 Feet

Scale 1: 15 840

(Joins sheet 78)

(Joins sheet 83)

(Joins sheet 85)

(Joins sheet 90)

R. 9 W.

T. 19 N.

1 620 000 FEET

1 610 000 FEET

1 615 000 FEET

1 605 000 FEET

Ridge

Arc

Bear

Coulee

Creek

Tamarack

Valley

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

U.S. DEPT. OF AGRICULTURE

TREMPEALEAU COUNTY, WISCONSIN

TREMPEALEAU COUNTY, WISCONSIN NO. 85

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on the map

N

R. 9 W. | R. 8 W.

T. 19 N.

1 625 000 FEET

120 000 FEET

115 000 FEET

1 640 000 FEET

(Joins sheet 84)

(Joins sheet 79)

(Joins sheet 86)

FaD2 DoA (Joins sheet 91)

Coulee

German

Fox

Abrahman

Scale 1: 15 840

1 Mile

5000 Feet

86

N

1 Mile

5000 Feet

Scale 1: 15 840

1:15 000 FEET

(Joins sheet 80)

R. 8 W.

1 660 000 FEET

120 000 FEET

T. 19 N.

(Joins sheet 85)

(Joins sheet 87)

(Joins sheet 92)

1 645 000 FEET

Frenchville

Smith School

Coulee

Abrahman

FRENCH CREEK

BEAVER CREEK

BEAVER

5 4 3 2 8 9 10 11

...and division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 86

TREMPEALEAU COUNTY, WISCONSIN NO. 87

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 88

88

N

1 Mile

5000 Feet

Scale 1: 15 840

(Joins sheet 82)

(Joins sheet 87)

(Joins sheet 94)

R. 7 W.

T. 19 N.

1 695 000 FEET

1 680 000 FEET

120 000 FEET

1 110 000 FEET

JACKSON COUNTY

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 88

TREMPEALEAU COUNTY, WISCONSIN NO. 89
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

90

N

1 Mile

5000 Feet

0 0 1000 2000 3000 4000 5000

Scale 1: 15 840

(Joins sheet 84)

R. 9 W.

1 620 000 FEET

110 000 FEET

105 000 FEET

T. 19 N.

(Joins sheet 91)

(Joins sheet 89)

(Joins sheet 96)

1 610 000 FEET

Arcadia Ridge

Tamarack Creek

Tamarack Valley

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 90

N

R. 9 W. | R. 8 W.

T. 19 N.

1 625 000 FEET

110 000 FEET

(Joins sheet 90)

(Joins sheet 85)

(Joins sheet 92)

(Joins sheet 97)

1 640 000 FEET

100 000 FEET

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN NO. 91

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 92

92

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0

¼ 1000

½ 2000

¾ 4000

1 5000

R. 8 W.

T. 19 N.

1 660 000 FEET

1 650 000 FEET

1 645 000 FEET

100 000 FEET

110 000 FEET

(Joins sheet 86)

(Joins sheet 91)

(Joins sheet 93)

(Joins sheet 98)

BEAVER CREEK

Flood

Dutch

Crystal Valley School

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5 000-foot grid ticks are approx

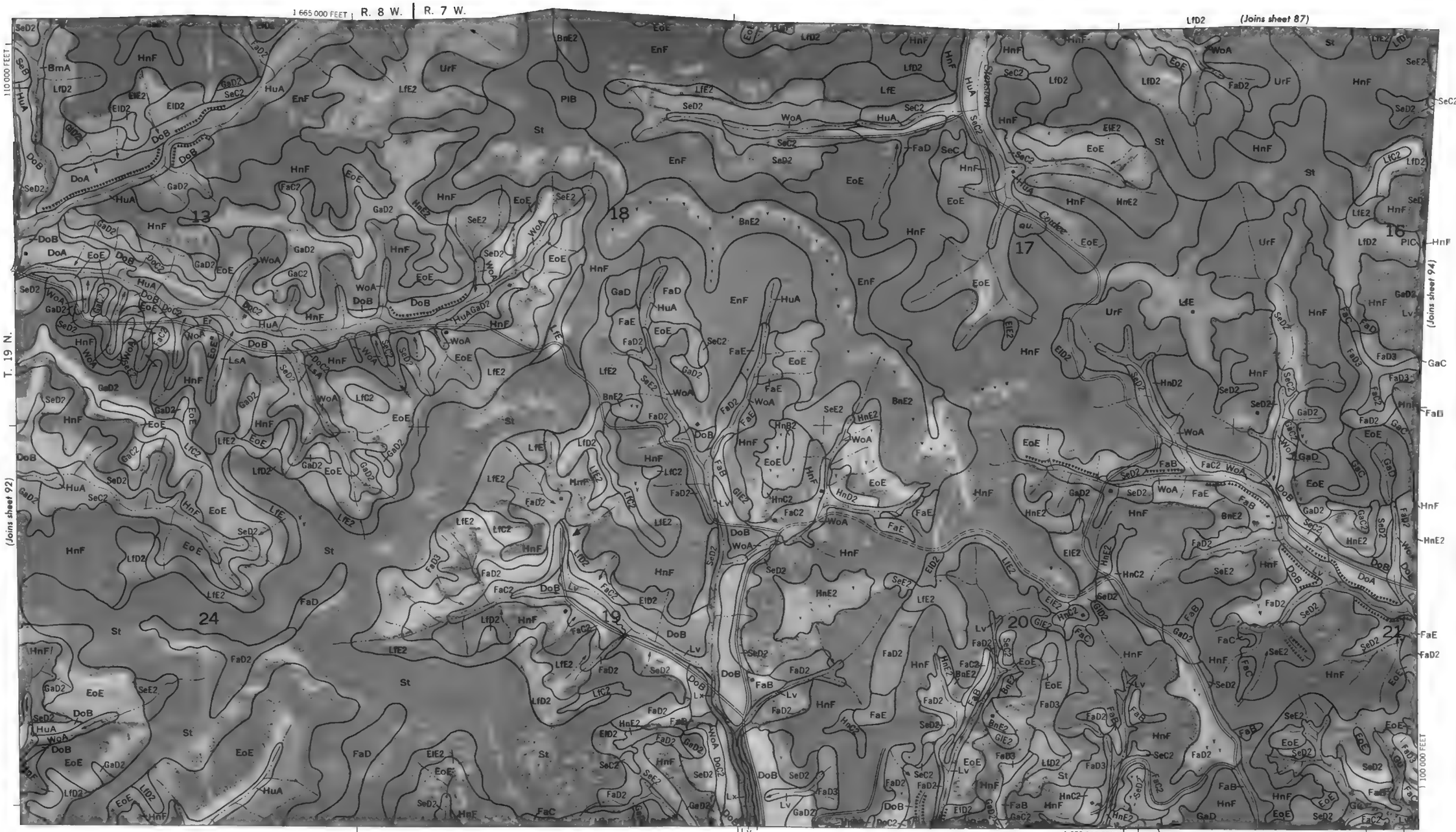
This map is one of a set compiled in 1974 as part of a soil survey by the United States De

Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

ED STATES DEPARTMENT OF AGRICULTURE

TREMPEALEAU COUNTY, WISCONSIN NO. 92

TREMPEALEAU COUNTY, WISCONSIN NO. 93
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on the map



93

N

1 Mile

5000 Feet

Scale 1: 15 840

94

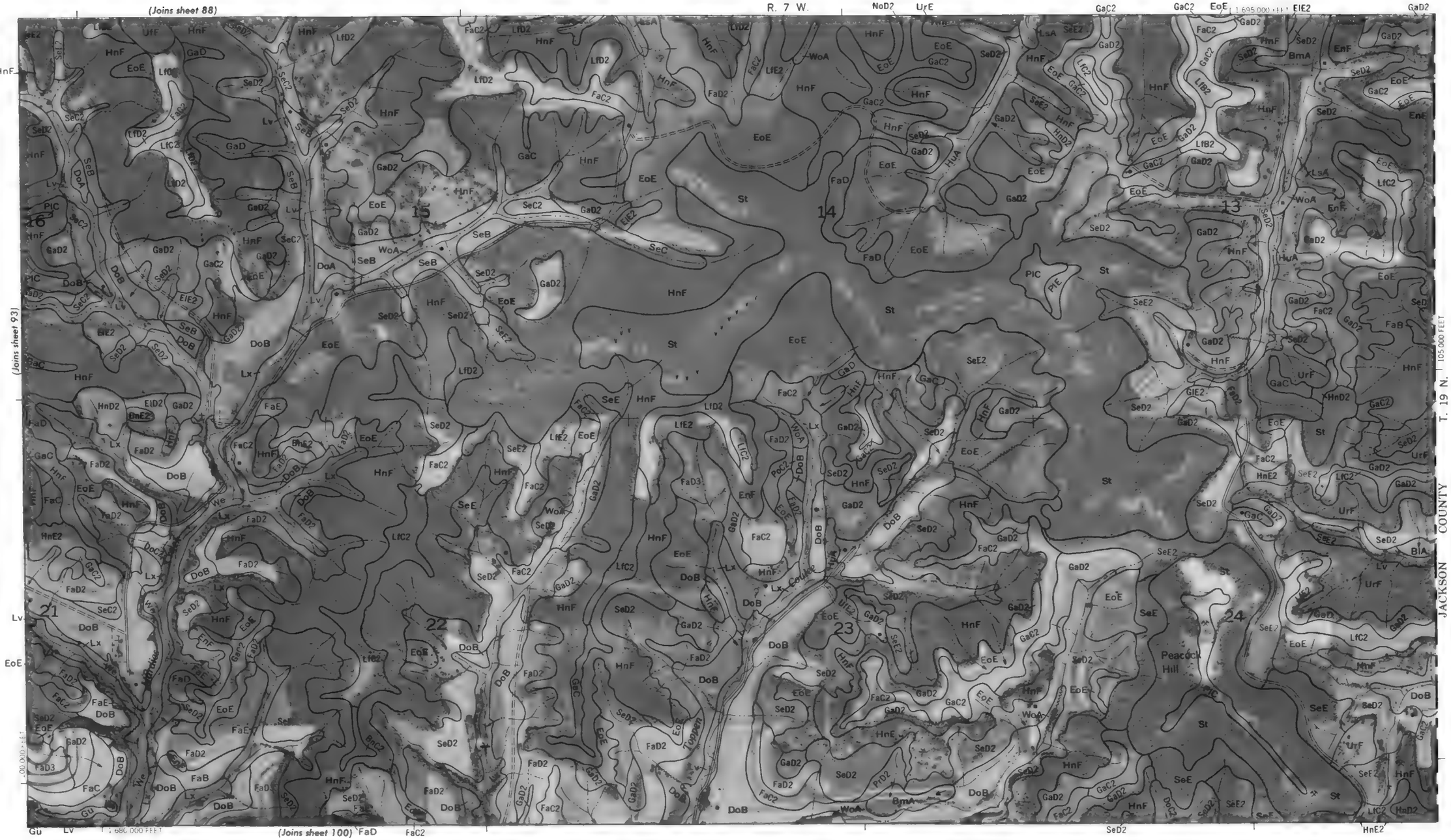
N

1 Mile

5000 Feet

Scale 1: 15 840

0 0 ¼ 1000 ½ 2000 ¾ 3000 1 4000 5000



Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5 000 foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

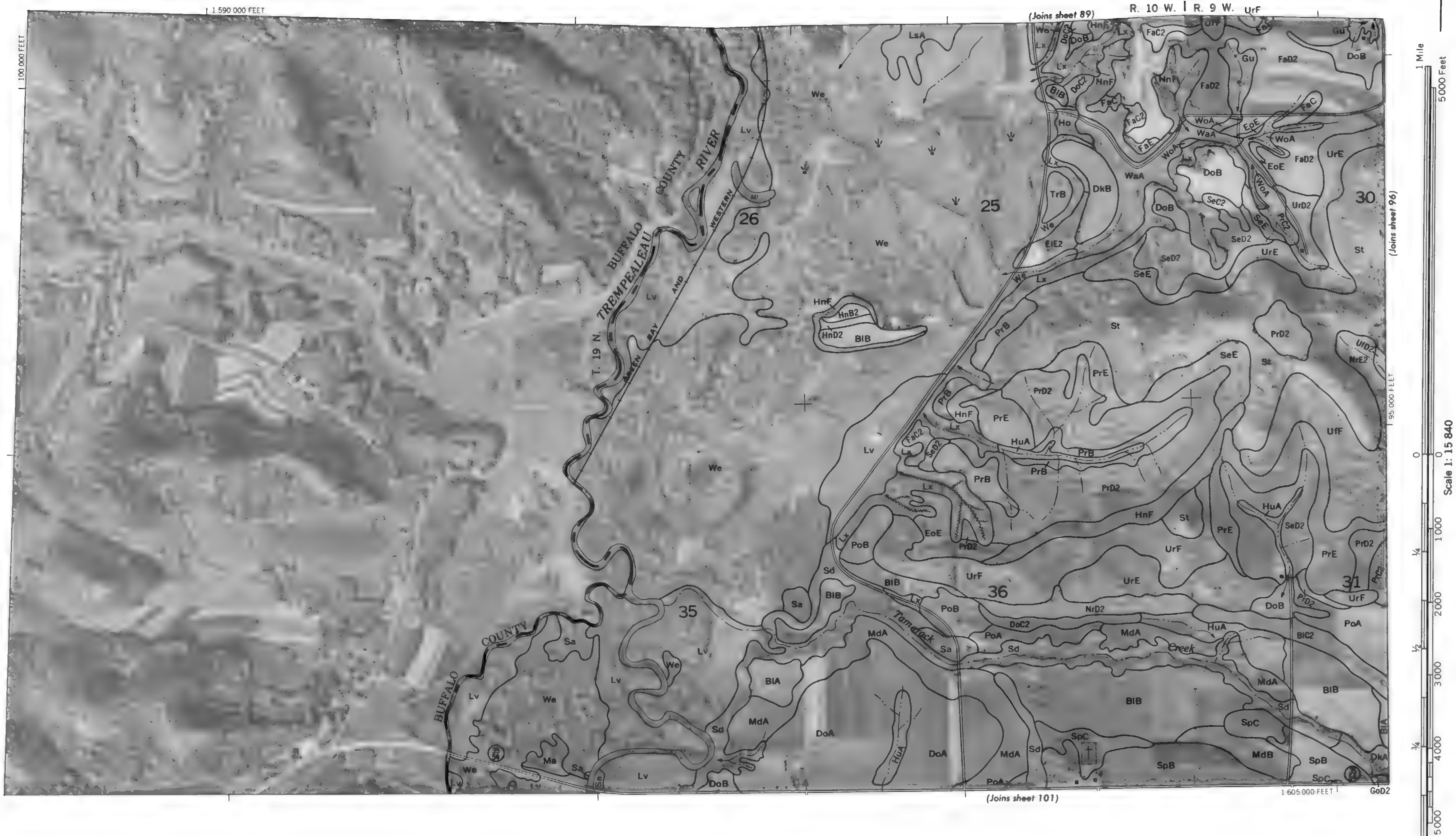
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin

Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

T. 19 N.

JACKSON COUNTY

TREMPEALEAU COUNTY, WISCONSIN NO. 94



TREMPEALEAU COUNTY, WISCONSIN NO. 95

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.
Land division corners are approximately positioned on the map.

96

N

1 Mile 5000 Feet

Scale 1: 15 840

(Joins sheet 90)

(Joins sheet 95)

(Joins sheet 102)

(Joins sheet 97)

R. 9 W.

T. 19 N.

1 620 000 FEET

1 610 000 FEET

95 000 FEET

100 000 FEET

Creek

Tamarack

Centerville

30 29 28 27 31 32 33 34

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 97
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.
Photobase from 1972 aerial photography. Positions of 5,000-foot grid lacks are approximate and based on the Wisconsin coordinate system, central zone Land division corners are approximately positioned on this map

(Joins sheet 91)
(Joins sheet 96)
(Joins sheet 98)
(Joins sheet 103)

R. 9 W. | R. 8 W.

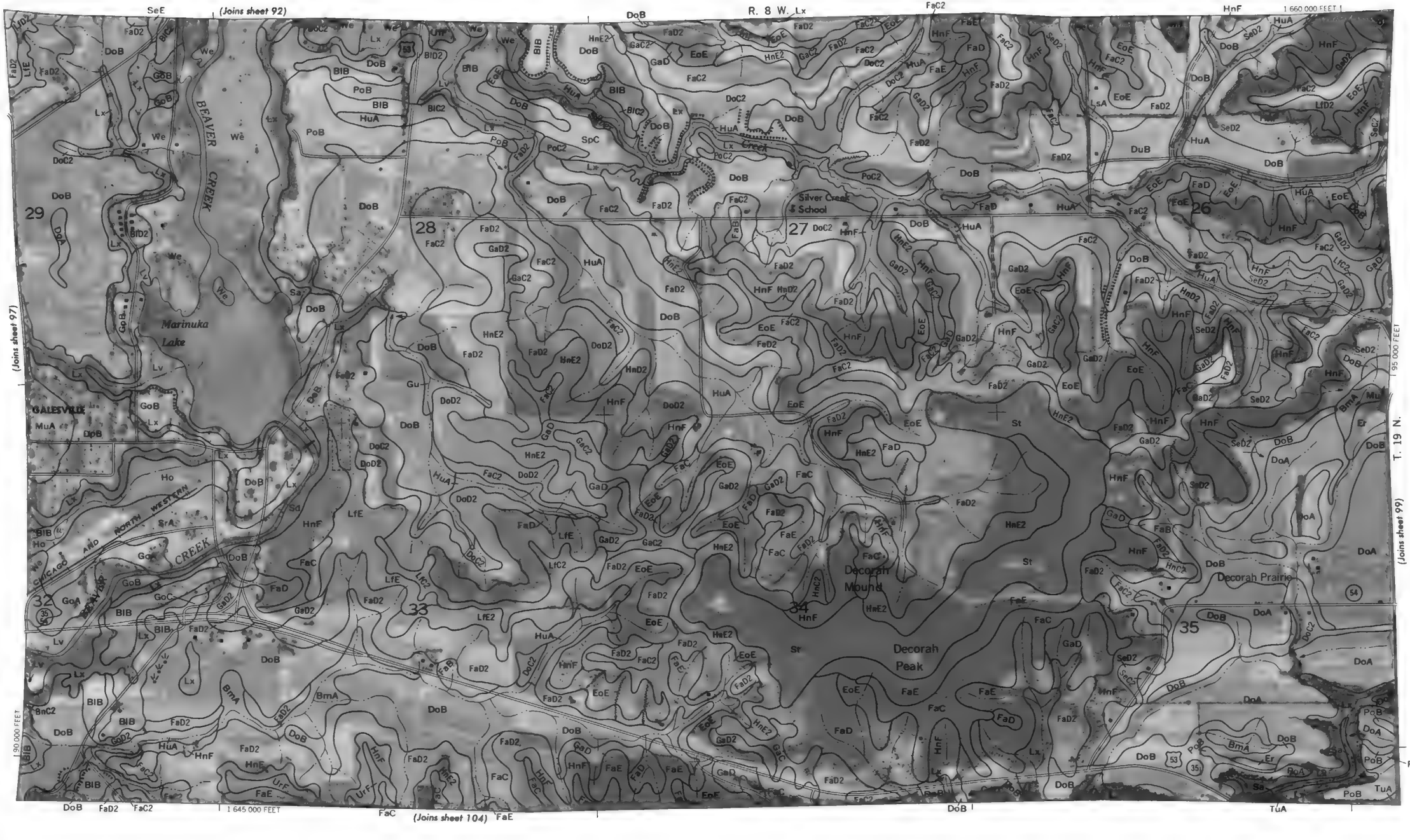
T. 19 N.

1 625 000 FEET
100 000 FEET
1 640 000 FEET
90 000 FEET

N

1 Mile
5000 Feet

Scale 1: 15 840



Land division corners are approximately positioned on this map
Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin
Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 98

TREMPEALEAU COUNTY, WISCONSIN NO. 99

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

100

N

1 Mile

5000 Feet

Scale 1: 15 840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

(Joins sheet 94)

R. 7 W.

1 695 000 FEET

(Joins sheet 99)

1 690 000 FEET

1 680 000 FEET

(Joins inset, sheet 105)

T. 19 N.

JACKSON COUNTY

LA CROSSE COUNTY

BLACK RIVER

BLACK

water

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, centralzone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 101

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 102

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 102

TREMPEALEAU COUNTY, WISCONSIN NO. 103
This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin
Photobase from 1972 aerial photography Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone
Land division corners are approximately positioned on this map

104

N

1 Mile

5000 Feet

0

Scale 1: 15 840

1/4 1000

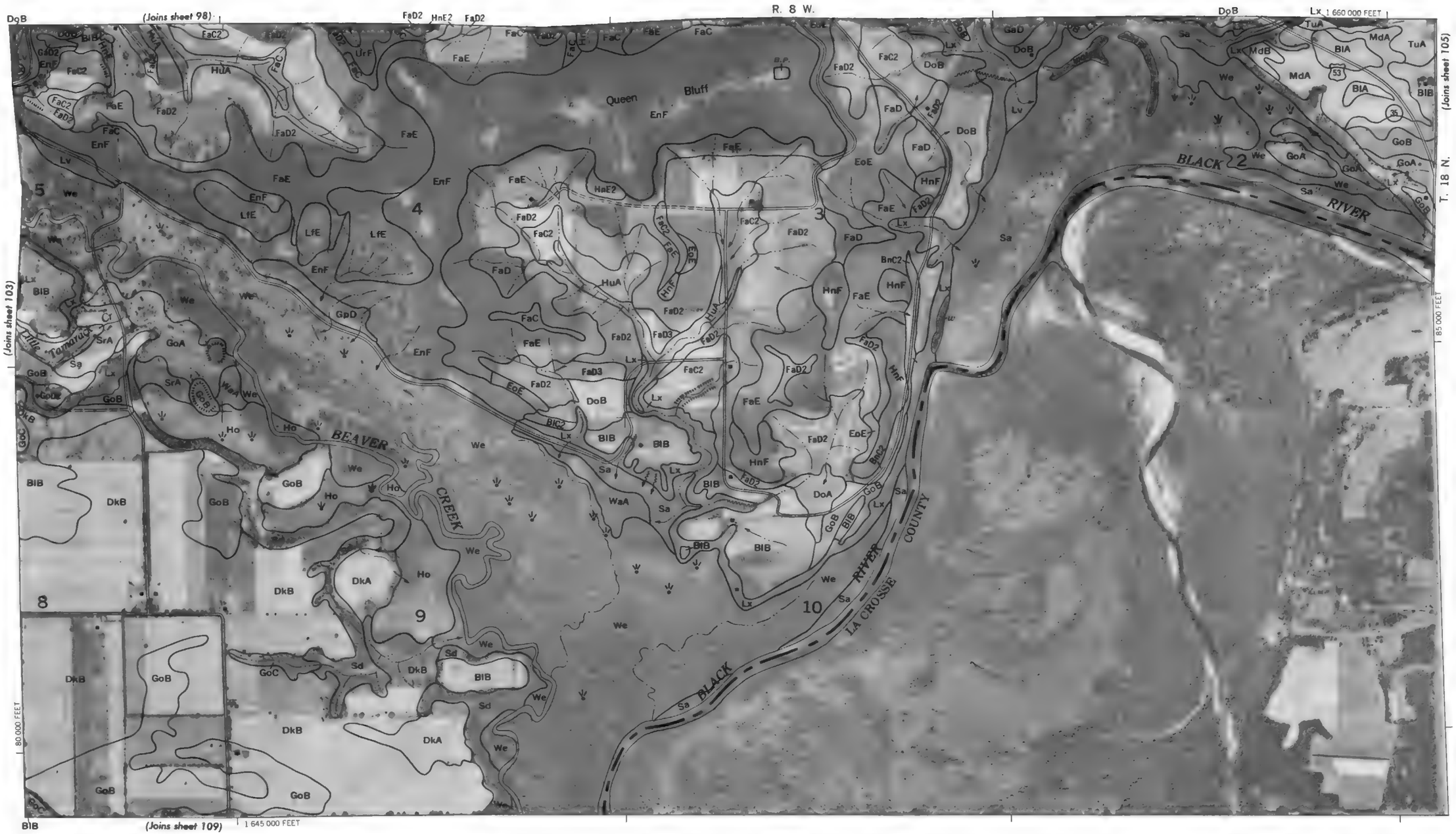
1/2 2000

3/4 3000

4000

5000

1



Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 104

TREMPEALEAU COUNTY, WISCONSIN NO. 105

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

R. 8 W. | R. 7 W.

1 665 000 FEET

1 680 000 FEET

1 682 000 FEET

1 675 000 FEET

85 000 FEET

80 000 FEET

T. 18 N.

(Joins sheet 104)

(Joins sheet 100)

(Joins sheet 99)

(Joins inset, sheet 105)

(Joins sheet 105)

BLACK RIVER

LA CROSSE COUNTY

water

2000 AND 3000-FOOT GRID TICKS

N

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 106

106

N

1 Mile

5000 Feet

Scale 1: 15 840

Land division corners are approximately positioned on the map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 106

TREMPEALEAU COUNTY, WISCONSIN NO. 107

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

Land division corners are approximately positioned on this map

108

N

1 Mile

5000 Feet

Scale 1: 15 840

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

5000

R. 9 W. | R. 8 W.

T. 18 N.

1 640 000 FEET

1 675 000 FEET

1 670 000 FEET

1 625 000 FEET

(Joins sheet 103)

(Joins sheet 107)

(Joins sheet 109)

(Joins sheet 111)

13 14 17 18 19 20 23 24

WESTERN

NORTH

ABR

CENTRAL

DkA DkB DkC DkD DIA DIB BlA BlB BlC2 GoA GoB GoC GoD2 GpD SpA SpB SpC SpD MdC2 Ka Sd

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

TREMPEALEAU COUNTY, WISCONSIN NO. 108

TREMPEALEAU COUNTY, WISCONSIN NO. 109

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

Land division corners are approximately positioned on this map.

(Joins sheet 104)

1 645 000 FEET

R. 8 W.

BEAVER CREEK

BLACK RIVER

LA CROSSE COUNTY

17

16

20

21

T. 18 N.

75 000 FEET

70 000 FEET

(Joins sheet 108)

(Joins sheet 112)

1 660 000 FEET

GoB GoC DkB DkA BlB BlA SpB SpC SpA GoA We Sd Sr Ln Lx Ly

109

N

1 Mile

5000 Feet

Scale 1: 15 840

1 ¾ ½ ¼ 0 1 Mile

5000 4000 3000 2000 1000 0 5000 Feet

Scale 1: 15 840

N

Land division corners are approximately positioned on this map.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone.

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

TREMPEALEAU COUNTY, WISCONSIN NO. 110

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 111

111

N

TREMPEALEAU COUNTY, WISCONSIN NO. 111

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone. Land division corners are approximately positioned on this map.

1 625 000 FEET

R. 9 W. | R. 8 W.

(Joins sheet 108)

T. 18 N.

65 000 FEET

(Joins sheet 110)

(Joins sheet 112)

60 000 FEET

1 640 000 FEET

LA CROSSE COUNTY

Trempealeau

BORROW PIT

BORROW PIT

First Lake

Second Lake

Third Lake

Long Lake

ROUND LAKE

MISSISSIPPI RIVER

WINONA COUNTY — MINNESOTA

CHICAGO, BURLINGTON AND NORTHERN

CHICAGO, NORTH WESTERN

TANK CREEK

26 25 30 29 35 36 31 32

1 Mile

5000 Feet

Scale 1: 15 840

TREMPEALEAU COUNTY, WISCONSIN — SHEET NUMBER 112

112

N

1 Mile

5000 Feet

Scale 1: 15 840

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

(Joins sheet 109)

R. 8 W.

1 660 000 FEET

165 000 FEET

(Joins sheet 111)

60 000 FEET

1 645 000 FEET

BLACK

RIVER

LA CROSSE COUNTY

T. 18 N.

28

29

27

32

33

34

DkB GoB GoC GoD2 MdB DoA MoA Lx Sd Lv We SrA Sa

LA CROSSE COUNTY

Land division corners are approximately positioned on this map

Photobase from 1972 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the Wisconsin coordinate system, central zone

This map is one of a set compiled in 1974 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin.

TREMPEALEAU COUNTY, WISCONSIN NO. 112